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ABSTRACT

In light of the projected growth in the percentages of women and minorities in the work force, as well as the need for increased skills among workers, a project was developed to improve recruitment and retention of women and minorities in associate degree science and engineering technology programs. The project involved on-campus seminars/workshops at three community colleges in the New York City area offering associate degree science and/or engineering technology programs (i.e., Bronx Community College, New York City Technical College, and Queensborough Community College). More than 140 college personnel attended, primarily teaching faculty, counselors and academic administrators. Each on-campus event was jointly planned with key campus personnel and was configured to meet local area needs. Expert presenters communicated both formally and informally with the participants and specially assembled kits of materials were distributed. More than 60% of all participants completing program evaluation forms from the three colleges rated the program as excellent. Programs and activities related to this project on each of the three campuses were enhanced, reinforced, and or newly created as a result of the seminar/workshops. Appendixes include seminar/workshop evaluation summaries, the names and positions of program registrants, bibliographies of the materials distributed, six summaries of specific workshop presentations, brochures and programs, and descriptions of follow-up programs, projects and activities undertaken at the three colleges. (GFW)

ED325197

# CAMPUS SEMINARS/WORKSHOPS TO IMPROVE RECRUITMENT AND RETENTION OF WOMEN AND MINORITIES IN ASSOCIATE DEGREE SCIENCE AND ENGINEERING TECHNOLOGY PROGRAMS

Final Report

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CAMPUS SEMINARS/WORKSHOPS TO IMPROVE
RECRUITMENT & RETENTION OF WOMEN & MINORITIES
IN ASSOCIATE DEGREE SCIENCE & ENGINEERING TECHNOLOGY PROGRAMS


ABSTRACT

This project provided on-campus seminars/workshops at three local community colleges which offer associate degree science and/or engineering technology programs. Teaching faculty, counselors and academic administrators were the primary participants. Each on-campus event was jointly planned with key campus personnel and was uniquely configured to the local needs and objectives which relate to recruitment and retention of women and minorities in associate degree science and engineering technology programs. Expert presenters provided direct formal and informal communication with the participants and specially assembled kits of materials were distributed. Follow-up communications determined that certain campus activities which relate to this project have been initiated or enhanced.

ACKNOWLEDGEMENTS

Dr. Bert Flugman, Principal Investigator, and Dr. Stan Brodsky, Project Director, gratefully acknowledge the essential cooperation and support received from a number of people who helped to make this project a positive contribution to the solution of difficult educational problems.

In the New York State Education Department, Assistant Commissioner Mike Van Ryn and his colleagues Charles Graber and Michael King provided the impetus and funding through the Carl D. Perkins Vocational Education Act.

At the three cooperating colleges, local personnel were instrumental in developing the programs, disseminating information to their college communities, and seeing to many local arrangements. The key people were: at Bronx Community College, Dr. Louise Squitieri; at New York City Technical College, Prof. Carmen Hernandez, Dr. Joan Kosan, Prof. Phyllis Sperling, and Prof. Ann Sprayregen; and at Queensborough Community College, Dr. Diane Call.

Melanie Bentley managed the financial affairs for the project including acquisition and organization of materials while Eileen Connelly handled the correspondence, duplicating and reportage.

## PROJECT NEED

### National Indications of Need

Changes in the national labor force to the year 2000 and beyond are projected to show slower overall growth with much of the growth coming from increasing proportions of women and minorities (1).

Between 1986 and 2000, two-thirds of the growth will be women, while the proportions of Blacks in the workforce will increase to 12% from 10% and Hispanics will grow to 10% even more rapidly from only 7% in 1986. The Bureau of Labor Statistics (BLS) of the U.S. Department of Labor predicts that technicians and service occupations will grow the fastest of the broad groupings. The BLS also notes that workers in occupations with large percentages of college trained personnel will tend to be fast growing, higher paid and less likely to be unemployed (2).

Blacks, Hispanics and women are underrepresented in science and engineering occupations relative to their proportions in the population. Thus, while Blacks and Hispanics represent 12% and 7% of the U.S. population, they accounted for only 2.5% and 2.0% of those employed in science and engineering positions in 1986. Similarly, only 1 in 4 science employees and 1 in 25 engineers were women in 1986 (3).

In recognition of this need, a new project initiated by the Carnegie Corporation and MIT to improve educational opportunities for minorities will plan to produce these results by the year 2000:

- Double the number of minorities taking college preparatory

courses in high school

- Triple the number of minorities who graduate college
- Quadruple the number of minorities receiving bachelor degrees in mathematics, science and engineering
- Quintuple the number of minorities in teaching
- Triple the number of minorities with doctorates in mathematics, science and engineering (4).

Two reports of recent annual surveys of enrollments and of degrees from associate degree engineering technology programs by the Engineering Manpower Commission (EMC) of the American Association of Engineering Societies provide some interesting data. These studies report enrollments in Fall 1988 and degrees earned during the 1987-1988 academic year (5, 6). Of the 209 institutions responding with associate enrollments, 180 also reported total numbers of associate degrees, 168 reported degrees received by women and 159 reported Black and Hispanic associate degree recipients. By assuming that the data across both studies represent a steady state condition, one can estimate retention rates of full-time students from first to second year and from first year to completion of degree. Thus nationally, 66% of first year students are still enrolled full-time in the second year (15,547 of 23,632 at 180 institutions) and 56% (13,193) receive degrees.

For women, 61% of the first year women full-time students (2,743 at 168 colleges) are enrolled in the second year (1,666) and 48% (1,314) receive degrees. The corresponding data for Blacks show 51% (928 of 1,813 at 159 institutions) and 31% (568), while

for Hispanics the numbers are 68% (450 of 660 at 159 colleges) and 37% (245).

The slippage of these groups in pursuing associate degrees in engineering technology can also be seen by comparing proportions of total first year enrollments with proportions of total degree recipients for the institutions which provided subgroup data. Women, Blacks and Hispanics constitute 12.4%, 9.0% and 3.3%, respectively, of the first year full-time students but only 10.6%, 4.8% and 2.1% of associate degree graduates, respectively.

Local Indications of Need

The New York State workforce is expected to follow similar trends as the nation between 1986 and the year 2000. The New York State Assembly's Program Development Group estimates that women will comprise over 75% of the State's workforce growth during that period and that "nearly all net workforce growth in New York State will come from women and minorities. Furthermore, the New York State workforce is expected to grow even more slowly than the nation's, to have a greater decline in numbers of young workers, and to have a larger component of minority workers. These demographic changes make it likely that New York will experience greater worker and labor-skill shortages than elsewhere. In the New York City area, these shortages will be exacerbated by lack of adequate transportation to job growth suburbs (7).

In an analysis of the regional economy by the Port Authority of NY & NJ, the long term outlook for the regional labor market was characterized as follows (8).

"The labor market is now adjusting to declining numbers of

young people entering the work force; even if the rate of job growth slows significantly from the pace of the last ten years, the number of jobs being created will grow at a faster rate than the working age population. Regardless of the rate of job growth, the demands of the job market now require higher levels of education, literacy and computational abilities, and strong communication and problem-solving skills. Simultaneously, this job market will be increasingly relying on minorities, immigrants and women, groups that have historically been limited in their employment opportunities by low education and skills levels, limited child care ahd transportation options, and restricted occupational mobility."

"The increase in education and skill requirements is the result of a combination of long-term trends which appear to be intensifying: the transformation of the economy from goods-producing industries to service-producing industries, the application of new office and production technologies, and the pressures of international competition and deregulation in some sectors. While these forces are eliminating many lower-skilled production and clerical jobs, they are increasing the demand for managerial, professional, and skilled technical occupations."

"...Future job growth will occur in occupations requiring the highest education levels. Between 1990 and 1995, jobs in the region are forecast to grow by 205,000, a more moderate level than during the mid 1980's, but still faster than labor force growth. White-collar jobs will continue to replace blue-collar jobs, a trend that became dominant in the 1970's. As in the 1980's,

manager and professional jobs will grow rapidly, by 195,000, capturing a larger share of all jobs."

"...The region's economic prosperity could be threatened by the inability of employers to find enough qualified workers: employers find urban education and training systems inadequate to the task of preparing the resident labor force for even entry-level jobs; immigrants with low education levels and poor English language skills continue to comprise a substantial and increasing portion of the region's labor force; and the scarcity and high cost of housing increasingly constrain the region's ability to attract skilled labor from elsewhere in the nation. The need to upgrade the region's labor force to meet the demand for skilled, well-educated workers has now become imperative, which suggests that intensified labor force development strategies will be among the most critical challenges for the remainder of the century."

These projected workforce problems will present new opportunities since well-trained and technically educated graduates may be expected to be flexible, mobile and in great demand.

The EMC studies noted above permit estimates of persistence and graduation rates in associate degree programs at colleges in the New York City metropolitan area. Unfortunately, not all local institutions have reported enrollments and degrees for Black and Hispanic students and some have not provided data for women students.

Within the limitations noted, in 9 local institutions, 55% of first year full-time students are enrolled in the second year and 32% earn degrees, compared with national proportions of 66% and

56%, respectively.

Six local institutions providing data for women students show that 50% make it to the second year from the first year while only 24% earn degrees.

Minority student data was available from only 4 local institutions; some colleges with large minority student populations were not included. Therefore, these data may not be fully representative of the local situation. For Black students in these 4 colleges, 50% of first year full-time associate program engineering technology students enroll in the second year and 30% receive degrees, while for Hispanics the corresponding data are 38% and 23%.

Local results compared with previously cited national data show that fewer local women are retained to the second year (50% vs. 61%) and only half as many graduate (24% vs. 48%). Retention of Hispanics is also poorer locally with fewer reaching the second year (38% to 68%) and lower graduation rates (23% to 37%). Similar data for Black students show local rates equivalent to national proportions (50% vs. 51% to second year and 30% vs. 31% graduating). One suspects that missing institutional data might reduce local retention rates, inasmuch as those reporting minority data had first year minority proportions of only 14% Black and 13% Hispanic while combined minority enrollments at some non-reporting institutions exceed 75%. Previous studies have shown local overall retention rates for Blacks and Hispanics to be less than 25%.

Regardless of the lack of precision, it is apparent that improving retention of women and minorities in engineering

technology and other mathematics and science based programs in local colleges is an important priority. Recruitment efforts are also needed to increase the proportion of women attracted to these programs. First year full-time enrollments in associate degree engineering technology programs are comprised of only 12% women nationally and 9% locally. Special attention needs to be paid to early pre-college programs as well as to high school groups to reduce the underrepresentation of women in these programs and the occupations which stem from them. Although Blacks and Hispanics attend most local urban institutions in greater proportions than are found nationally, recruitment efforts need to be focused on ensuring adequate preparation for engineering-related studies in critical subjects, such as mathematics. Here again, pre-college programs and guidance will be important. In addition, accurate information needs to be disseminated to high school and junior high school students and their parents about careers which are associated with these programs.

It is apparent that the problems of underrepresentation of women and minorities in science and engineering occupations are complex and variant. Many institutions have to learn how to attract more women and minority students to the "hard" sciences and technologies, which are still relatively non-traditional areas for both groups. Those institutions with large minority student enrollments need to do a better job of retaining students who have the potential to complete these demanding programs as well as accurately counseling parents and students in advance of registration. Colleges which succeed in attracting substantial

numbers of women to science and engineering technology programs need to be sensitive to the special concerns of women students. Techniques for both recruitment and retention have been developed which have been shown to improve enrollments and completion rates. This project provided participants with direct access to experts and information emphasizing problem-solving techniques which can be adapted to the local scene.

## PROJECT OBJECTIVES

### General Objectives

This project was designed to meet the following general objectives:

1. To bring and interpret to the participants recent research findings, demographic trends and successful experiences applicable to recruitment and retention of women and minorities in science and engineering technology associate degree programs.

2. To encourage participants to exchange information about their experiences regarding recruitment and retention of women and minorities in such programs for the purpose of identifying additional innovative problem-solving approaches.

3. To provide participants with encouragement and incentives to share materials and ideas with others in their departments and to develop individual and group activities related to this project.

### Specific Objectives

Within the framework of the general objectives, the following specific objectives defined the project scope and orientation:

1. To select three colleges in the local region of New York

State which offer associate degree programs in science and/or engineering technology.

2. To design an intensive on-campus seminar/workshop jointly with key personnel at each college for up to 20 participants in a format which will attract teaching faculty, counselors, and academic administrators from target departments.

3. To have each participant learn about a variety of techniques which they may use in improving either recruitment or retention of women and minority students at their college.

4. To provide participants with direct access to project experts in formal sessions and informal small group discussions.

5. To provide technical advice and assistance, as requested, in developing and implementing activities stemming from this project.

## OVERVIEW OF THE PROJECT

There were three distinct phases of this project; pre-workshop phase, seminar/workshop phase, and follow-up phase.

In the first phase, three cooperating colleges were selected and local contact persons identified. Individual series of meetings with the contact persons determined the particular events which were preferred by each college. Dates were established, facilities secured, speakers identified, and advertising prepared and disseminated. Where appropriate, supplementary workshop materials were selected by speakers and staff, duplicated and assembled into kits for dissemination to participants.

The second phase consisted of seminars/workshops in a variety

of formats according to local institutional preferences and involved more than 140 college professionals.

In the third phase, communication with the local contact persons provided data about follow-up activities on each campus. There were no formal requests for technical assistance.

## SEMINARS/WORKSHOPS

Prior to planning local college events it was determined that there would be the equivalent of a full day seminar/workshop at each campus. After campus consultations, a full day activity was planned at New York City Technical College, and two partial day activities each were scheduled for Bronx Community College and Queensborough Community College. Lists of registrants, materials distributed, summaries of selected presentations, and copies of brochures and programs can be found in Appendicies B, C, D, and E, respectively.

### Bronx Community College

The first of two seminars/workshops at this campus was an afternoon session on January 19, 1990 led by Dr. Jose P. Mestre of the University of Massachusetts at Amherst on the topic of Cognitive Research in Math-Science Education. The session was co-sponsored by the Comprehensive Regional Center for Minorities, an NSF-funded program. In attendance were 21 math and science faculty from several local colleges including 11 from the host institution. Dr. Metsre's presentation included numerous practical illustrations and examples, many of which would help science and math instructors become more effective in retaining students. Several handouts were

distributed by Dr. Mestre.

A morning seminar/workshop took place on May 23, 1990 at Bronx Community College. This session was focussed on "Classroom Strategies for Retention of Women & Minorities in Associate Degree Science & Engineering Technology Programs." Dr. Eleanor Baum, Dean of Engineering, Cooper Union, and Dr. Lloyd M. Cooke, President of LMC Associates discussed the topic emphasizing the teacher's role in retention of students. In addition, a student-alumni panel provided student viewpoints. A period of open discussion involved the audience and all of the presenters in an interesting and lively exchange of views. An extensive kit of resource materials was distributed to the participants.

New York City Technical College

The first seminar/workshop of this project was a full day event held at New York City Technical College on January 11, 1990. The morning was devoted to a well-researched keynote address by Dr. David R. Reyes-Guerra, Executive Director, Accreditation Board for Engineering and Technology and panel presentations by three experts followed by audience questions and discussion. Dr. Eleanor Baum, Dean of Engineering, Cooper Union, spoke on "The Role of the Teacher in Student Retention," Professor John Goodlet, Chairman of the Department of Technology, The City College of CUNY, discussed "Retention Strategies in an Upper Division Transfer Program in Engineering Technology," and Dr. Lloyd M. Cooke, President, LMC Associates, moderated the panel and presented strategies which students should be made aware of supported by a booklet which he had authored entitled "Design For Excellence: How To Study

Smartly."

The 39 participants were formed into small discussion groups with one of the presenters during the luncheon period. The remainder of the afternoon featured a student/alumni panel followed by a wide-ranging open discussion session. The discussion was so rich and enthusiastic that the other activities planned for the afternoon were curtailed to avoid interfering with the momentum which the large group discussion has generated.

Queensborough Community College

Two somewhat different events were planned at Queensborough Community College. The first, held on March 21, 1990, was a major address by Dr. Sara E. Melendez, Vice-Provost, University of Bridgeport, which served the college as the annual Presidential Lecture. Dr. Melendez discussed "Pluralism in Science & Technology Programs: Preparing Women and Minority Students," which was followed by an extended formal audience question period and informal conversations with many of the 45 attendees. Dr. Melendez presented a number of overhead transparencies and handouts.

The second event, which was part of Tech Trek, the college's science and technology exposition, was in the form of a panel of six science and technology alumni of the college. Their presentations took place on May 11, 1990 in an auditorium. Each of the panelists discussed their occupational responsibilities, how their work at the college related to their employment, and suggestions for students and faculty. The audience of about 800 consisted largely of secondary school students, 20 of their teachers, and 30 Queensborough faculty. An audience question

period followed after which the panelists and the college faculty met in small groups. The panelists included an intensive care unit nurse, a field engineer with an electronic equipment manufacturer, a bio-medical engineering technician, an electrical engineer with IBM, a senior engineer with an electronics firm, and a staff director of management employment for NYNEX. Professor Stuart Asser of the Department of Electrical & Computer Engineering Technology moderated the panel.

## EVALUATION

Summaries of evaluation forms completed by participants are shown in Appendix A.

### Bronx Community College

Both seminars/workshops at Bronx Community College were evaluated by participants on forms appropriate for each session.

Participants responding to the January 19, 1990 workshop featuring Dr. J. P. Mestre, all agreed or strongly agreed that the "information was presented clearly" and they "expect(ed) to use some of the ideas in my teaching." Twelve of the 14 respondents identified a "best thing about the workshop" while four mentioned a "worst thing."

The seminar/workshop on classroom strategies for retention was given an overall rating of "excellent" by 60% of the respondents and "good" by the remaining 40%. Following the workshop, the Project Director and the six speakers met to critique the session and suggest ways to improve future on-campus seminars/workshops.

A total of 33 registrants attended the Bronx events including 4

faculty who attended both sessions.

New York City Technical College

Twenty-eight of the 39 participants completed evaluation forms after the January 11, 1990 seminar/workshop. Sixty-five percent gave the seminar/workshop an overall rating of "excellent" and 35% rated it "good." Ninety-one percent gave an "excellent" rating to the distributed materials.

Queensborough Community College

The March 21, 1990 event which featured Dr. Sara Melendez was attended by 45 Queensborough Community College professionals. However, only 10 attendees submitted completed evaluation forms since they were not distributed until a day or two after the session. Eight of the 10 respondents gave overall workshop ratings of "excellent" or "good."

No formal evaluation questionnaire was used for the May 11, 1990 alumni presentations because the large auditorium setting was not considered suitable. However, it was clear to the Project Director that the presentations were very well received by the faculty, a perception which was confirmed by several individual conversations with faculty.

Overall

The experience with seminars/workshops on three campuses indicates that several different formats can be effective in presenting techniques to faculty for improving student retention.

The Project Director, after consulting with several experts associated with this project, believes that combinations of activities are most effective if they are mutually reinforcing and

the audience has sufficient opportunity for participation.

One or more authoritative presentations by recognized experts, including recent findings and practical techniques are effective elements which, in combination with useful resource materials, will be appreciated by faculty. In addition, a selected student and alumni panel can stimulate faculty participation in useful discussion.

Programs, projects and activities which relate to this project on each of the three campuses are detailed in Appendix F. While some of these activities appear to have been initiated as a result of the seminars/workshops, there are ongoing programs at all three colleges which have been enhanced and reinforced by this project.

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## APPENDIX A

## SEMINAR/WORKSHOP EVALUATION SUMMARIES


| | | |
|---|---|---|
| Bronx Community College | -- January 19, 1990 | 20 |
| | -- May 23, 1990 | 22 |
| New York City Technical College | -- January 11, 1990 | 24 |
| Queensborough Community College | -- March 21, 1990 | 28 |

N=14 (21 ATTENDED)

Workshop Evaluation

| | strongly agree | agree | disagree | strongly disagree |
|---|---|---|---|---|
| 1. The objectives of the workshop were clear. | 7 | 7 | | |
| 2. Information was presented clearly. | 9 | 5 | | |
| 3. Materials provided appear useful. | 6 | 6 | | |
| 4. Activities were useful. | 5 | 5 | | |
| 5. I expect to use some of the ideas presented in my teaching. | 8 | 5 | | |

6. The best thing about the workshop was

12 COMMENTED

7. The worst thing about the workshop was

4 COMMENTED

8. Additional comments/suggestions

6 COMMENTED

FACULTY DEVELOPMENT WORKSHOP AT BRONX COMM COLL

DR. JOSE MESTRE, U OF MASS - AMHERST

Workshop _____ Date 1/19/90 AFFILIATION _____

**Faculty Development Workshop at Bronx Community College**
**on January 19, 1990 - Dr. Jose Mestre (University of Massachusetts-Amherst)**

Evaluation Comments

Item 6. The best thing about the workshop was. . .

1. Lively presentation by Jose Mestre.
2. Tuning in common problems.
4. It offered challenges to the "business as usual" attitudes that pervade most science and math teaching.
5. A discussion of common problems that teachers often encounter. Good for teacher training.
6. Examples of misconceptions and differences between how novices and experts organize knowledge.
7. Examples of problems.
8. The obvious knowledge and skill of the lecturer.
9. The examples illustrating the concepts described.
10. Examples from current research. Examples of common misconceptions.
11. Review of appropriate teaching strategies for novice learners.
12. Importance of information presented and style of presenter.
14. The sharing of strategies.

Item 7. The worst thing about the workshop was. . .

1. Overhead transparencies were not left on long enough to take in completely.
2. Not being able to communicate more on these problems.
4. The lecture format.
11. Presented mainly as a lecture and was not bi-directional enough.

Item 8. Additional comments/suggestions. . .

2. I'd like to have the seating arranged in a circle, so that more discussion will be held and facilitated.
4. This is a very good start. I hope the remainder of the presentations are as good.
6. High quality stuff. If this is typical of this series--it should be extremely useful.
9. I hope we discuss how to organize classes for group instruction.
10. It would have helped to be given more examples and resources to refer to in other areas, e.g., biology.
11. The survey choices above are not comprehensive enough. A category of not applicable is necessary.

SEMINAR/WORKSHOP ON CLASSROOM STRATEGIES FOR RETENTION
at Bronx Community College -- 5-23-90

N=15

EVALUATION SUMMARY

Please check ONE of the responses to each of the following items.

1. How would you rate each of the keynote presentations?

A. "The Role of the Teacher in Student Retention"

9 excellent 4 good 1 adequate ____ poor

B. "Design For Excellence: How To Study Smartly"

2 excellent 11 good 1 adequate ____ poor

Comments on either or both of the presentations:
3 COMMENTED

2. How would you rate the Student/Alumni Comment Panel?

6 excellent 9 good ____ adequate 1 poor

Comments:
1 COMMENTED

3. How would you rate the open group discussion session?

7 excellent 8 good ____ adequate ____ poor

Comments:
3 COMMENTED

4. How would you rate the distributed materials for your purposes?

7 excellent 6 good 1 adequate ____ poor

Comments:
1 COMMENTED

5. What is your overall rating of the seminar/workshop?

9 excellent 6 good ____ adequate ____ poor

Comments:
1 COMMENTED

SMB -- CASE/CUNY

**Seminar/Workshop on Classroom Strategies for Retention**
**at Bronx Community College**
**5/23/90**

Evaluation Comments

Item 1. How would you rate each of the keynote presentations?

6. On B: For me the written material provided was more valuable than the content of the talk.

10. The pamphlet "Design for Excellence" was very useful.

13. Unfortunately, although they were well-prepared, neither speaker presented any ideas that were new, stimulating, controversial.

Item 2. How would you rate the Student/Alumni Comment Panel?

10. The choice of students was very good.

Item 3. How would you rate the open group discussion session?

2. Excellent because we were able to discuss some other problems that involved students problems and needs.

6. Not clear who was moderating.

10. I'm glad to have heard more about Learning-to-Learn strategies.

Item 4. How would you rate the distributed materials for your purposes?

10. There was insufficient time to evaluate this (for me at least).

Item 5. What is your overall rating of the seminar/workshop?

10. I am glad I attended.

SEMINAR/WORKSHOP ON CLASSROOM STRATEGIES FOR RETENTION
at New York City Technical College -- 1-11-90

EVALUATION N=28 (39 ATTENDED)

Please check ONE of the responses to each of the following items.

1. How would you rate the keynote presentation? N=28
50% excellent 36% good 11% adequate 4% poor
Comments: _____

2. How would you rate each of the morning panel presentations?

A. "The Role of the Teacher in Student Retention" N=28
82% excellent 18% good _____ adequate _____ poor

B. "Design For Excellence: How To Study Smartly" N=27
67% excellent 25% good 4% adequate 4% poor

C. "Retention Strategies in an Upper Division Transfer Program in Engineering Technology" N=28
39% excellent 39% good 14% adequate 7% poor
Comments on all or any part of the panel: _____
8 COMMENTS

3. How would you rate the Student/Alumni Comment Panel? N=19
53% excellent 42% good _____ adequate 5% poor
Comments: _____
5 COMMENTS

4. How would you rate each of the small group discussion sessions?

A. The working lunch small group discussion session. N=18
44% excellent 50% good 6% adequate _____ poor

B. The afternoon small group discussion session. N=14
71% excellent 29% good _____ adequate _____ poor
Comments: _____
5 COMMENTS

5. How would you rate the distributed materials for your purposes? N=23
91% excellent 9% good _____ adequate _____ poor
Comments: _____
3 COMMENTS

6. What is your overall rating of the seminar/workshop? N=26
65% excellent 35% good _____ adequate _____ poor
Comments: _____
6 COMMENTS

SMB -- CASE/CUNY

**SEMINAR/WORKSHOP ON CLASSROOM STRATEGIES FOR RETENTION**
**New York City Technical College**
**1/11/90**

EVALUATION COMMENTS

Item 1. How would you rate the Keynote presentation?

#2 I found some of the material really redundant to the way our school actually works. (rating = good)

#4 Not much new (rating = good)

#5 He wasn't familiar with his audience--brought up issues which CUNY recognized years ago. (rating = adequate)

#12 Not on topic. (rating = poor)

#16 Having the text available was very helpful. (rating = good)

#23 Rote delivery. (rating = good).

Item 2. How would you rate each of the morning panel presentations?

A. "The Role of the Teacher in Student Retention"

#9 Dr. Baum offered strategies which will be very helpful especially with Freshman students. (rating = excellent)

#12 Dr. Baum spoke most specifically to the topic. (rating = excellent)

#16 Dr. Baum's presentation was down to earth and practical, obviously based on her considerable experience. (rating = excellent)

B. "Design For Excellence: How To Study Smartly."

#2 I think I would have liked to hear more of this topic. (rating = good)

C. "Retention Strategies in an Upper Division Transfer Program in Engineering Technolgy."

#4 Too many statistics. Couldn't read the charts anyway. (rating = adequate)

#15 Very informative. John Goodlet strategies in engineering technology are excellent. (rating = excellent)

#16 Prof. Goodlet's statistics were interesting and worthwhile. Good job! (rating = good)

#21 Panelist spoke on topic which was not relevant to most in the room. All other presentations apply to all in room. (rating = adequate)

Item 3. "How would you rate the Student/Alumni Comment Panel?

#2 Very well handled with sensitive observations and good anecdotal material. This student/teacher interaction should be developed into a larger format. It was probably the most valuable part of the presentation and extremely helpful to the faculty present. This could be very valuable if repeated in the future in equally small groups, but between experienced students and relatively new instructors to promote sensitivity to student needs and feelings. (rating = excellent)

#4 Communicated well. (rating = excellent)

#9 Very moving--makes you want to do more. (rating = excellent)

#14 Good to hear actual successful experiences. (rating = excellent)

#16 Prof. Sperling and Angel Sierra were excellent. Unable to stay for others. (rating = excellent)

Item 4. How would you rate each of the small group discussion sessions?

A. The working lunch small group discussion session

#15 Dr. Baum's group touched all the bases, in discussing women in engineering technology and how to increase enrollment. (rating = excellent)

B. The afternoon small group discussion session.

#2 As a continuation of Item 3, I was most informed and interested in the discussion of student/teacher concerns. (rating = excellent)

#4 Most of the people spoke up. (rating = excellent)

#6 Should be more organized. (no rating)

#14 Small discussion groups much more effective than presentations. (rating = excellent)

Item 5. How would you rate the distributed materials for your purposes?

#4 A good range of references. (rating = excellent)

#9 Looking forward to reading the materials. (rating = excellent)

#21 Initial perception. Not completely sure till I get a chance to read it all. (rating = excellent)

Item 6. What is your overall rating of the seminar/workshop?

#1 One a year is not enough. (rating = excellent)

#2 Based on my evaluation of items 3 and 4B. Let's see and hear more of this. (rating = excellent)

#4 Stimulating. (rating = excellent)

#16 The title of the workshop "Retention of Women and Minorities" was a turn-off for me. Retention is a problem across the board, and the notion of "special" strategies for women and minorities seems silly, especially since our student body is overwhelmingly minority. (rating = good)

#20 A well organized and well presented seminar. Some valuable points were made which are applicable in all disciplines. (rating = excellent)

#21 Many excellent ideas given for faculty and students. I will convey info to my department faculty. (rating = excellent)

3/21/90

QUEENSBOROUGH COMMUNITY COLLEGE
The City University of New York

DR. SARA MELENDEZ

N=10 (45 ATTENDED)

Presidential Lecture Series

Your evaluation of Dr. Sara Melendez's presentation on "Pluralism in Science and Technology Programs: Preparing Women and Minority Scientists" would be appreciated and helpful in faculty development program planning.

Please indicate your assessment of the presentation by circling one number for each category:

| | POOR (1) | FAIR (2) | GOOD (3) | EXCELLENT (4) |
|---|---|---|---|---|
| Overall workshop rating | 1 | 2 (2) | 3 (4) | 4 (4) |
| Knowledge of subject | 1 (1) | 2 | 3 (3) | 4 (6) |
| Clarity of presenter's idea | 1 | 2 (1) | 3 (6) | 4 (3) |
| Relevance of handouts | 1 (1) | 2 (2) | 3 (3) | 4 |
| Use of printed/audio-visual material | 1 (1) | 2 (5) | 3 (3) | 4 |
| Adequacy of time | 1 (2) | 2 (1) | 3 (4) | 4 (1) |
| Opportunity for participation | 1 (2) | 2 (4) | 3 (1) | 4 (1) |

| | Not At All (1) | Moderately (2) | Very Much (3) |
|---|---|---|---|
| Enhancement of personal development | (1) | (4) | (4) |
| Enhancement of professional development | (1) | (5) | (3) |

Additional comments on Dr. Melendez's presentation:

6 COMMENTED

Recommendations for future presentations on this or other topics of interest to you:

2 COMMENTED

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When completed, please return this sheet to Diane Call L-417



Thank you.

## APPENDIX B

## SEMINAR/WORKSHOP REGISTRANTS


| | | |
|---|---|---|
| Bronx Community College | -- January 19, 1990 | 30 |
| | -- May 23, 1990 | 31 |
| New York City Technical College | -- January 11, 1990 | 32 |
| Queensborough Community College | -- March 21, 1990 | 34 |
| | -- May 11, 1990 | 35 |

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**Faculty Development Seminar/Workshop at Bronx Community College**

**on January 19, 1990 at 2:30 p.m.**
**Dr. Jose Mestre, University of Massachusetts-Amherst**

Pre-Registrants & Attendance List

| | |
|---|---|
| Gail Baker | LaGuardia Community College |
| Madeline Bates | Bronx Community College |
| *Alan Benimoff | College of Staten Island |
| Gurcharas S. Bhalla | Bronx Community College |
| Stan Brodsky | CASE/CUNY |
| Maria Cassio | LaGuardia Community College |
| Samaroo Deonarine | Bronx Community College |
| Susan Forman | Bronx Community College |
| June Gaston | Borough of Manhattan Community College |
| Hope Hartman | City College CRCM |
| Carol Haspel | LaGuardia Community College |
| *Giovanni Impeduglia | College of Staten Island |
| Erwin Just | Bronx Community College |
| Paul Klarreich | Bronx Community College |
| *Ruth Lebowitz | LaGuardia Community College |
| Martin Millman | LaGuardia Community College |
| Jalil Mothaddasi | Bronx Community College |
| Joseph O'Sullivan | Bronx Community College |
| Yvonne C. Powell | LaGuardia Community College |
| Louise Squitieri | Bronx Community College |
| *John Stevenson | LaGuardia Community College |
| *Chia Chi Tsui | College of Staten Island |
| Herbert Tyson | Bronx Community College |
| David Waldman | Borough of Manhattan Community College |
| Clara Wu | LaGuardia Community College |
| Chung-Mo Wang | Bronx Community Collge |

33

*Pre-Registered but did not attend

**Seminar/Workshop on Retention Strategies**
**5/23/90 at Bronx Community College**

Pre-Registration & Attendance List

| | | |
|---|---|---|
| *Howard Balter | Assoc. Prof, Biology & Med Lab Tech | 212-220-6239 |
| Madeline Bates | Asst Prof, Mathematics | 212-220-6336 |
| Michael Bennett | Asst Prof, Mathematics | 212-220-6084 |
| *(Dr.) G.S. Bhalla | Assoc. Prof, Mathematics | 212-220-6329/41 |
| (Dr.) Louis DeAcetis | Prof. Physics | 212-220-6209 |
| Adrian Figueroa | Lecturer, Student Development | 212-220-6045 |
| Susan Forman | Assoc. Prof, Mathematics | 212-220-6324 |
| Dolores Gracian | Assoc. Prof, Chemistry | 212-220-6166 |
| Frank Haase | Asst. Prof, Biology & Med Lab Tech | 212-220-6122 |
| Iris Hawkins | Student Development | 212-220-6045 |
| Erwin Just | Prof, Mathematics | 212-220-6341 |
| Michal King | Supervisor, Bur. Post-Sec Grants Administration, NYSED | 518-474-5705 |
| Evelyn Kish | Assoc Dean of Students | 212-220-6055 |
| Herbert Tyson | Prof & Chair, Engineering Technologies | 212-220-6066 |

*Pre-Registered but did not attend.

## SEMINAR/WORKSHOP ON CLASSROOM STRATEGIES FOR RETENTION

### NEW YORK CITY TECHNICAL COLLEGE
**Thursday, January 11, 1990**

### PRE-REGISTRANTS

| | |
|---|---|
| Frances Avner | Assoc. Dean, Academic Affairs |
| Dennis Bakewicz | Asst. Prof, Biological Sciences |
| Carmelle Bellefleur | Asst. Prof, Nursing |
| Valerie H. Crosdale | Asst. Prof, Nursing |
| Ethel Devone | Health Services, Student Affairs |
| Mark Elkins | Assoc. Prof. & Chair, Electromechanical ET |
| Steven J. Gerardi | Director, Pre-Career Education |
| Carmen D. Hernandez | Asst. Prof., SEEK |
| *Howard R. Hull | Asst. Prof. & Chair, Mechanical Engrg. Tech. |
| *Andre Hurni | Adjunct Prof, Architectural Tech. |
| Mario J. Iraggi | Prof., Academic Affairs |
| *Hortense B. Jaffe | Assoc. Prof., Dental Hygiene |
| *Leonard A. James | Prof. & Director, Academy for Science & Tech. |
| Meredith Kattke-Erikson | Asst. Prof., Mathematics |
| Joan H. Kosan | Prof. & Coordinator, Urban Horticulture |
| Arthur Kramer | Prof., Mathematics |
| Beverly A. Lapuma | Prof., Continuing Education |
| Pauline E. Luk | Counselor, Div. of Health & Nat'l. Sci. |
| Martin F. Mangan | Assoc. Prof., Student Affairs |
| Nicholas Manos | Asst. Prof., Dental Lab Tech. |
| George B. Marshall | Assoc., Prof. Electromechanical Egnrg. Tech. |
| Biman Mitra | Asst. Prof., Biological Sci/Medical Lab Tech. |
| Pearline Okumakpeyi | Assoc. Prof., Nursing |
| Henry Ortiz | Asst. Prof., Mechanical Engrg. Tech. |
| Kathryn Richardson | Asst. Prof., Nursing |
| Herman E. Sands | Prof., Architectural Tech. |
| Annette F. Schaefer | Asst. Prof., Biological Sci. |
| Phyllis Sperling | Assoc. Prof., Architectural Tech. |
| Ann Sprayregen | Assoc. Prof., Student Affairs |
| Thomas M. Turner | Asst. Prof., Education, Queens College |
| Shirley E. Tyson | Assoc. Prof., Nursing |
| *Evelyn B. Whitaker | Vice-Pres., Student Affairs |
| *Nathaniel Woods | Asst. Prof., SEEK |
| Neil Wotherspoon | Adjunct Asst. Prof., Electromechanical ET |
| Richard Woytowich | Asst. Prof., Mechanical Engrg. Tech. |

*Did not attend

SEMINAR/WORKSHOP ON CLASSROOM STRATEGIES FOR RETENTION

NEW YORK CITY TECHNICAL COLLEGE
Thursday, January 11, 1990

NEW REGISTRANTS

| | |
|---|---|
| Shantel Childs-Williams | Instructor, Dental Hygiene |
| Elliot Colchamiro | Prof., Civil & Construction Tech |
| Al Finger | Prof. & Chair, Environmental Control Tech. |
| Arlene Matsumoto Floyd | Director of Admissions |
| Leonard Friedman | Assoc. Prof., Dental Hygiene |
| Ronald W. Holloway | Dean, Division of Engineering Technology |
| Arthur Katz | Assoc. Prof., Ophthalmic Dispensing |
| Louis Radioli | Prof., & Chair, Civil & Construction Tech. |
| Linda Silverman | Project Director, Access for Women |
| Victor Strozak | Prof., Chemistry |

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## QUEENSBOROUGH COMMUNITY COLLEGE CONFERENCE 3/21/90
**Dr. Sara E. Melendez-Vice President, University of Bridgeport**

Attendance List

| | |
|---|---|
| Jospeh Aidala | Electrical & Computer Engineering Technology |
| Pat Allaire | Math and Computer Science |
| Joanna Ambron | Biological Sciences |
| Gladys Aponte | Student Services |
| Beatrice Aronowich | Chemistry |
| Henry Berney | Vice President, Administration |
| Dona Boccio | Math and Computer Science |
| Camille Bodden | Nursing |
| Marilyn Braun | Biological Sciences |
| Diane Call | Student Services |
| J. R. Carver | Electrical and Computer Engineering Technology |
| Edward Chapel | Director, Institutional Research |
| Barron Clarke | Student Services |
| Mary Constance | Math and Computer Science |
| Pat Evanoski | Student Services |
| Mona Fabricant | Math and Computer Science |
| Frances Geer | Student Services |
| Karen R. Grant | Business |
| Kathleen Hartnett | Nursing |
| Joyce Heyward | Nursing |
| Marty Jocobs | Student Services |
| Marcia V. Keizs | Dean of Students |
| Suzanne King | Social Science (Psychology) |
| Pat Martin | Office of Enrollment Management |
| Dwight Meyer | Biological Sciences |
| Mary Miksic | Biological Sciences |
| Michael Miller | Student Services |
| Rose O'Connor | Math and Computer Science |
| Sarah Papier | Student Services |
| Charles Prancl | Library |
| Sylvester Reese | Math and Computer Science |
| Byron Schieber | Mechanical Engineering Technology |
| Helga Schwartz | Math and Computer Science |
| Valerie Seeley | Biological Sciences |
| Tom Shemanski | Library |
| John Snyder | Basic Education Skills |
| Karen Steele | Asst. Dean/Academic Affairs |
| Sylvia Svitar | Math and Computer Science |
| Alice Tahaney | Nursing |
| Clara Wajngurt | Math and Computer Science |
| Cynthia S. West | Health, Physical Education and Dance |
| Annette Winston | Nursing |
| Harvey Workman | Biological Sciences |
| Meredith Young | Basic Education Skills |
| Ernest Zahner | Biological Sciences |

QUEENSBOROUGH COMMUNITY COLLEGE
The City University of New York

COLLEGE DISCOVERY PROGRAM

TO: Dr. Stan Brodsky DATE: July 19, 1990

FROM: Dr. Diane Call SUBJECT: Faculty Attendance

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The following faculty participated in the Queensborough Community College Science and Technology Alumni Panel on Friday, May 11, 1990. This event sponsored by CASE/CUNY was part of TECH TREK, QCC's Science and Technology Exposition. the Panel presentation was attended by over 800 science and math students and faculty.

| | |
|---|---|
| Mr. Fishniek | J.H.S. 226 |
| Anne Sharkis | J.H.S. 192 |
| Miss Durkin | Jamaica H.S. |
| Mr. Wondrach | Freeport H.S. |
| Ms. Richard | Great Neck North |
| Mr. Schlotack | Middle School |
| Mr. Jackie | J.H.S. 210 |
| Mr. Ainard | J.H.S. 210 |
| Ms. Cap | J.H.S. 180 |
| Ms. Jadonath | J.H.S. 180 |
| Mr. Greenberger | J.H.S. 145 |
| Ms. Diane Asser | Southwood Middle School Syosset |
| Mr. Ken Llinas | P.S. 140 |
| Mrs. McCormerch | Linden Middle School |
| Mr. DelPrete | Floral Park H.S. |
| Stan Friedenberg | Andrew Jackson |
| Rita Volpe | Mary's Nativity |
| Norma Butscher | J.H.S. 109 |
| Mr. Zuccerlin | John Adams H.S. |
| Mr. Cuevas | GED Aux. Ser. for H.S. |

M.T/DD Department QCC
Alex Fesolowich
Shelly Kohen
Leo DeMarinis
Norton Reid
James Valentino
Robert Talamo
Craig Weber
Martin Powell

Nursing Department QCC
Elaine Muller
Alexandra Tarasko
Bernadette Robo

Biological Sciences Department QCC
Robert G. Cotty

Mathematics & Computer Science QCC
Jacob Applman
Clara Wajnurt
Allen Barnes

ET/CT Department QCC
Stuart Asser
Edward Marcinek
Charles Spiteri
Denis McGarrigle
Bruce Naples
Edward Brumgnach
Salvatore Levanti
Peter Stark
Vincent Stigliano
Joe Aidala

Physics Department QCC
Don Engleberg
Elie Lowy
Chao-Wen Chin
Dinah Moche
Robert Taylor

## APPENDIX C

## SEMINAR/WORKSHOP MATERIALS DISTRIBUTED


| | | |
|---|---|---|
| Bronx Community College | -- January 19, 1990 | 38 |
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| New York City Technical College | -- January 11, 1990 | 42 |
| Queensborough Community College | -- March 21, 1990 | 46 |
| | -- May 11, 1990 | 77 |

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## MATERIALS DISTRIBUTED DURING SEMINAR/WORKSHOP AT BRONX COMMUNITY COLLEGE ON JANUARY 19, 1990

R.R. Cocking and J.P. Mestre. "Cognitive Science." Handbook of Knowledge Engineering, 1989. Washington, DC: Systemsware. (Includes an extensive bibliography).

P.T. Hardiman, R. Dufresne and J.P. Mestre. "The Relation Between Problem Categorization and Problem Solving Among Experts and Novices," Memory & Cognition, 1989, 17 (5) pp. 627-638.

J.P. Mestre, "Impact of Culture on Learning Math," College Prep Vol 5: Counseling Students for Higher Education, The College Board, Inc., New York, pp. 28-31, August 1989.

J.P. Mestre, R.J. Dufresne, W.J. Gerace, P.T. Hardiman and J.S. Touger, Enhancing Higher-Order Thinking Skills in Physics. August 1989.

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SOME TAKE-HOME MATERIALS FOR THE SEMINAR/WORKSHOP ON CLASSROOM STRATEGIES FOR RETENTION OF WOMEN & MINORITIES IN ASSOCIATE DEGREE SCIENCE & ENGINEERING TECHNOLOGY PROGRAMS
Wednesday, May 23, 1990 at Bronx Community College

Booklets, Monographs & Papers:

Cooke, Lloyd M., Design For Excellence: How To Study Smartly, National Action Committee for Minorities in Engineering, 1986, pp. 16. (enclosed)

_____, "How To Study Smartly," 1987. (enclosed)

_____, "What Students Should Do On Their Own To Increase Chances To Complete Demanding Science and Technology Programs," December 1989, pp. 3. (enclosed)

Felder, Richard M., et. al., "Oh God, Not Another Teaching Workshop!," Engineering Education, ASEE, September/October 1989, pp. 622-624. (enclosed)

"Rethinking Services For Today's Underdeveloped College Students," Review, Vol. 1, No. 1, Higher Education Extension Service, Yale University, Winter 1989. (enclosed)

Odell, Morgan & Jere J. Mock (eds.), A Crucial Agenda: Making Colleges and Universities Work Better For Minority Students, WICHE, Boulder, Colorado, July 1989, pp.117. (Contents + several pages enclosed)

Parilla, Robert, Report on the National Science Foundation Workshop on Science, Engineering, and Mathematics Education in Two-Year Colleges, NSF, June 1989.(Executive Summary + a few pages enclosed)
What Americans Study, Educational Testing Service, Princeton, NJ, 1989, pp. 27. (1 page enclosed)

Cellucci, Philomena M. C. & Teresa P. Price, "IMPACT: A Map For Success. A High-Risk Student Retention Plan," Report presented at AACJC Annual Convention, Dallas, Texas, April 1987, pp. 77. (Abstract + references enclosed)

Starks, Gretchen, "Retention of Adult Women Students in the Community College: Research Findings from Exceptional Case Studies," Paper presented at American Educational Research

Books, Monographs & Papers (continued):
Association Annual Meeting, Washington, DC, April 1987, pp. 13. (Abstract + a few pages enclosed)

Black, MacKnight, "Minority Student Issues: Racial/Ethnic Data Collected by the National Center for Education Statistics Since 1969," National Center for Education Statistics, US Department of Education, No. CS89-267, March 1989. (Introduction enclosed)

"Projections of Education Statistics to 1997-98," National Center for Education Statistics, US Department of Education, No. CS88-607. (Highlights enclosed)

Newspaper Articles, etc. (all enclosed):

"Wanted: 675,000 Future Scientists and Engineers," Science, Vol. 244, June 30, 1989, pp. 1536-1537.

"Blacks, Hispanics and Native Americans are Severely Underrepresented in the Engineering Profession," Manpower Comments, March 1989, pp. 15-16.

"Minorities Up In Engineering But Still Low & Of Work Force," Engineering Times, April 1990, p. 7.

Lee, Felicia R., "`Model Minority' Label Taxes Asian Youths," The New York Times, March 20, 1990, pp. B1, B4.

Leone, Les L., et. al., "Diverse Sources of Engineers and How One State Coordinates Them," Engineering Education, ASEE, April 1988, pp. 691-692.

Skoner, Peter R. & Mary R. Jalongo, "Retention Problems in Pre-Engineering Programs," Engineering Education, ASEE, April 1988, pp. 692-694.

Carmody, Dierdre, "Minority Students Gain on College Entrance Tests," The New York Times, September 12, 1989, p. A16.

"The Value of an Education," The New York Times, November 8, 1989, p. B 12.

"Report of the Task Force on Science, Engineering and Mathematics," CUNY, September 1989. (Appendix C enclosed "Strategies for Recruitment of Undergraduate Students in SETM")

"Urban Community Colleges are Urged to Develop a `National Strategy' to Address the Problems of the Inner Cities," Manpower Comments, November 1989, p. 30.

"First Phase of Project 2061: Better Teaching of Core Science Ideas Advocated," Engineering Times, April 1989, p. 10.

Berger, Joseph, "Teach College Teachers to, Yes, Teach, Panel Says," The New York Times, April 19, 1989, p. B9.

Newspaper Articles, etc. (all enclosed) (continued):

Leary, Warren E., "Report Says Math Teaching in US Needs an Overhaul," The New York Times, January 27, 1989, p. A 16.

Daniels, Lee, A., "On Front Line of Fight for Better Math Teaching," The New York Times, March 29, 1989, p. B9.

"Uncle Sam Wants You To Go Metric (by '92)," Engineering Times, August 1989.

Kolata, Gina, "Math Is Only New When The Teacher Doesn't Get It," The New York Times, April 2, 1989, p. 32 E.

Spofford, Tim, "The Unchanging Classroom: Sobol Assails Resistance to Technology," Albany Times Union, August 30, 1989.

Odato, James M., "NY Behind in Engineering and Science, Conference Told," Schenectady Gazette, May 31, 1989.

Weiss, Samuel, "CUNY Science Courses Teetering on Disaster," The New York Times, October 16, 1989.

"Not Making The Grade," Business Week, October 20, 1989.

Chapple, Alan, "NSF, Escalante Team Up: Fast-Track Math & Science Rouses Inner-City Youth," Engineering Times, August 1989, p. 5.

"A Fair Chance For Young Black Men," The New York Times (editorial), April 4, 1989, p. A 26.

McKenna, Barbara, "The New `New Math'," American Teacher, April 1989, pp. 8, 9, 12.

Culliton, Barbara, "The Dismal State of Scientific Literacy," Science, Vol. 243, February 3, 1989, p. 600.

Rothman, Robert, "Sciences Group Unveils Plan to Revise Curricula: Project 2061 Defines Core `Literacy' Goals," Education Week, March 1, 1989.

Freundlich, Naomi, "Making Science More Seductive to Women on Campus," Business Week, August 28, 1989, p. 89.

Fiske, Edward B., "Lessons: With Paper, String and Ingenuity, An Engineer Teaches Students Science Through Experience," The New York Times, April 19, 1989, p. B9.

Johnson, Tieachia & Raymond J. S. Ruybe, "The Science Skills Center: A Haven For Learning," New Youth Connections, April 1989.

Johnson, Tieachia, "Math and Science: Who Needs It?," New Youth Connections, April 1989.

Prepared by S. M. Brodsky 4/23/90

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APPENDIX C

SEMINAR/WORKSHOP
MATERIALS DISTRIBUTED

SOME TAKE-HOME MATERIALS FOR THE SEMINAR/WORKSHOP ON CLASSROOM STRATEGIES FOR RETENTION OF WOMEN & MINORITIES IN ASSOCIATE DEGREE SCIENCE & ENGINEERING TECHNOLOGY PROGRAMS
Thursday, January 11, 1990 at New York City Technical College

Booklets, Monographs & Papers:

Cooke, Lloyd M., Design For Ecellence: How To Study Smartly, National Action Committee for Minorities in Engineering, 1986, pp. 16. (enclosed)

_____, "How To Study Smartly," 1987. (enclosed)

_____, "What Students Should Do On Their Own To Increase Chances To Complete Demanding Science and Technology Programs," December 1989, pp. 3. (enclosed)

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"Rethinking Services For Today's Underdeveloped College Students," Review, Vol. 1, No. 1, Higher Education Extension Service, Yale University, Winter 1989. (enclosed)

Odell, Morgan & Jere J. Mock (eds.), A Crucial Agenda: Making Colleges and Universities Work Better For Minority Students, WICHE, Boulder, Colorado, July 1989, pp.117. (Contents + several pages enclosed)

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What Americans Study, Educational Testing Service, Princeton, NJ, 1989, pp. 27. (1 page enclosed)

Atkin, J. Myron & Ann Atkin, Improving Science Education Through Local Alliances, Network Publications, Santa Cruz, California, 1989. (Table of Contents enclosed)

Cellucci, Philomena M. C. & Teresa P. Price, "IMPACT: A Map For Success. A High-Risk Student Retention Plan," Report presented at AACJC Annual Convention, Dallas, Texas, April 1987, pp. 77. (Abstract + references enclosed)

Books, Monographs & Papers (continued):
Starks, Gretchen, "Retention of Adult Women Students in the Community College: Research Findings from Exceptional Case Studies," Paper presented at American Educational Research Association Annual Meeting, Washington, DC, April 1987, pp. 13. (Abstract + a few pages enclosed)

Voorhees, Richard A., "Toward Building Models of Community College Persistence: A Log-Linear Analysis," Paper presented at Association for Institutional Research Annual Forum, Orlando, Florida, June 1986, pp. 26. (Abstract + a few pages enclosed)

"Enrollment, Completion, Attrition, and Vocational Course-Taking Patterns in Postsecondary Education: A Comparison of 1972 and 1980 High School Graduates Entering Two-Year Institutions," National Center for Education Statistics, US Department of Education, No. CS89-360, April 1989. (Summary of Findings enclosed)

Black, MacKnight, "Minority Student Issues: Racial/Ethnic Data Collected by the National Center for Education Statistics Since 1969," National Center for Education Statistics, US Department of Education, No. CS89-267, March 1989. (Introduction enclosed)

"Projections of Education Statistics to 1997-98," National Center for Education Statistics, US Department of Education, No. CS88-607. (Highlights enclosed)

Newspaper Articles, etc. (all enclosed):

"Wanted: 675,000 Future Scientists and Engineers," Science, Vol. 244, June 30, 1989, pp. 1536-1537.

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"First Phase of Project 2061: Better Teaching of Core Science Ideas Advocated," Engineering Times, April 1989, p. 10.

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Daniels, Lee, A., "On Front Line of Fight for Better Math Teaching," The New York Times, March 29, 1989, p. B9.

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Spofford, Tim, "The Unchanging Classroom: Sobol Assails Resistance to Technology," Albany Times Union, August 30, 1989.

Odato, James M., "NY Behind in Engineering and Science, Conference Told," Schenectady Gazette, May 31, 1989.

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Prepared by S. M. Brodsky 1/4/90

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## ADDITIONAL MATERIALS DISTRIBUTED DURING SEMINAR/WORKSHOP AT NEW YORK CITY TECHNICAL COLLEGE JANUARY 11, 1990

Accreditation Board for Engineering and Technology, pamphlet describing ABET, its accreditation activities and procedures, its organization, and its authorization, 9 pp.

ABET List of Publications and Order Form

Accredited Programs Leading to Degrees in Engineering Technology 1989, ABET, New York, 27 pp.

"Retention Strategies in an Upper Division Program in Engineering Technology," John Goodlet, Department of Technology, School of Engineering, The City College. A set of materials and copies of transparencies which were used during the presentation. Included were information about the BT program, student census, degrees by curriculum and by ethnicity, numbers of students by feeder school and major, retention predictors and math placement method.

DISTRIBUTED DURING PRESENTATION BY DR. SARA E. MELENDEZ
AT QUEENSBOROUGH COMMUNITY COLLEGE ON MARCH 21, 1990

## LIMITATIONS THAT ACADEMICALLY DISADVANTAGED STUDENTS BRING TO THE STUDY OF SCIENCE

1. LACK OF EXPERIENCE ON WHICH TO BUILD THE ABSTRACTIONS OF SCIENCE.
2. WEAKNESS IN MATHEMATICAL AND VERBAL SKILLS.
3. LACK OF CONFIDENCE IN THEIR ABILITY TO SOLVE PROBLEMS THROUGH THEIR OWN REASONING.
4. LOW TO AVERAGE STANDARDS FOR ACADEMIC ACHIEVEMENT.
5. LITTLE UNDERSTANDING OF FUNCTIONING OF MEMORY SYSTEM, OF MEMORY TECHNIQUES AND OF THEIR OWN COGNITIVE/LEARNING STYLES.

## APPROACH TO INSTRUCTION

1. IDENTIFICATION OF SPECIFIC INTELLECTUAL DIFFICULTIES (CONCEPT FORMATION & REASONING DEVELOPMENT).
2. DESIGN CURRICULUM SO THAT DIRECT EXPERIENCE PRECEDES DISCUSSION OF FORMAL CONCEPTS AND LAWS.
3. INCORPORATION OF AFFECTIVE AND CULTURAL CONSIDERATIONS INTO STUDY OF SCIENCE.
4. INCORPORATION OF FUNCTIONAL SUPPORT SYSTEMS (CLASS & CLINIC).

DISTRIBUTED DURING PRESENTED BY DR. SARA E. MELENDEZ
AT QUEENSBOROUGH COMMUNITY COLLEGE ON MARCH 21, 1990

## LEARNING STYLES
## Selected Bibliography


Claxton, Charles S., Adams, Dale, and Williams, Del. "Using Student Learning Styles in Teaching." AAHE BULLETIN, May 1982, Vol. 34, No 9, pp. 1, 7-10.

This article emphasizes the importance of using learning styles to enhance student learning in the upcoming times and discusses several basic questions faculty and administrators ask about ways to use learning style information. It describes several different models and instruments, namely a) Kolb Learning Style Inventory, b)Canfield Learning Styles Inventory, c) Canfield Instructional Styles Inventory, d) Learning Interaction Inventory, and e) Student Learning Styles Scales. It also presents helpful suggestions for use in teaching,, advising, orientation and counseling.

Claxton, Charles S. and Ralston, Yvonne. Learning Styles: Their Impact on Teaching and Administration. AAHE-ERIC/Higher Education Research Report No. 10, Washington, D.C., 1978.

The first section of this two-part monograph elaborates on theory and research on Learning Styles. The research findings offer substantial promise towards effective student learning. The author notes that for this to occur, changes are required in the administration of instructional programs. Thus, the second looks at the implications for the implementation and administration of new curricular models.

Cross K. Patricia. Accent on Learning. San Francisco: Jossey-Bass, 1977.

This work stresses a pluralistic curricular approach to individualized educational experiences for students, particular the "New Student" who is enrolled in college as a result of open admissions. While the entire book is excellent, the reader interested in learning styles will find Chapter 5, "Cognitive Styles," to be particularly helpful on theory and research in this area. The chapter concludes with a discussion regarding "Implications of Cognitive Styles for Educational Practice."

Ewing, David W. "Discovering Your Problem-Solving Style." PSYCHOLOGY TODAY, December, 1977, pp. 69-73, 138.

The central thesis of this article is that an individual's problem-solving style is important to career success. The discussion is based on research on McKenney and Kenn, who investigated the problem-solving behavior of nearly 200 graduate business students and categorize problem-solvers as "perceptive"

(looking for facts that fits their mental image) and "receptive" (focusing on detailing and the "feel" of new facts). When these problem-solving styles are articulated with intuitive and systematic thinking styles, four cognitive styles are identified: systematic-perceptive, systematic-receptive, intuitive-precaptive, and intuitive-receptive. Since their data indicates that most people apply their preferred style to all problems, they conclude that people should try to select careers which are consistent with their problem-solving habits.

## LEARNING STYLES (CONTINUED)

### Selected Bibliography

Grasha, Anthony F. "Observations on Relating Teaching Goals to Student Response Styles and Classroom Methods." AMERICAN PSYCHOLOGIST, February, 1972, pp. 144-147.

The author reflects on his experience with learners and observes that in the traditional classroom environment, three response styles of students are observable: Avoidant, Competitive, and Dependent. To overcome problems associated with these response styles and to implement his teaching goals, Grasha tested the impact of these teaching strategies: use of study guides that incorporate student ideas, group experiences based on student perception of relevance, "teacher-of-the-day" sharing of classroom operation responsibility, and grading policy designed to reduce grade anxiety. The quasi-experimental research design yielded data confirming the hypothesis that use of these non-traditional criteria foster student behavior which is more collaborative, participative, and independent than students in more traditional (teacher-centered) classroom environments.

Kolb, David A. "Learning Styles and Disciplinary Differences" in Arthur W. Chickering and Associates, The Modern American College. San Francisco: Jossey-Bass, 1981.

The author discusses a theory of experiential learning and the four learning styles that he derived through the administration of a Learning Style Inventory. He describes learning as a four-stage cycle, with all four abilities required to be an effective learner. Further, the article reports several studies dealing in the learning styles and different disciplines, the purpose of which is to better understand and manage the educational process. Also reported are studies on learning styles, academic performance and adaptation to life.

McCarthy, Bernice. The 4MAT System: Teaching To Learning Styles With Right/Left Mode Techniques. Oak Brook, Illinois: Excel, 1980.

The author promotes the 4MAT system as an efficient and simple way of teaching students. The book first deals with the four major learning styles as identified by Kolb and others. Next, the research findings on right and left brain are described. The author believes that the development and integration of all four modes of learning, and the development and integration of both right and left-brain processing skills, should be a major goal of education. The 4MAT System moves through the learning cycle in sequence, which is a natural learning progression. This book is an interesting and beneficial aid for teachers, trainers and students.

Witkin, Herman A. "Cognitive Style in Academic Performance." In S. Messick and others, Individuality in Learning. San Francisco: Jossey-Bass, 1976, pp. 38-72.

The stated concern of this chapter is cognitive style as a "potent variable" affecting student academic choice and vocational preference, continuing student academic development, how students learn and teachers teach, and how they interact in the classroom. Cognitive styles are analyzed in terms of field-dependent and field-independent personal characteristics. The discussion is organized into Nature of Cognitive Styles," "Cognitive Style in Academic Evolution," "Teaching, Learning, and Teacher-Student Interection," and "Applications."

APPENDIX D

SEMINAR/WORKSHOP PRESENTATION SUMMARIES


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Summary of "Student Retention" by Dr Eleanor Baum at Seminar/Workshop at Bronx Community College on May 23, 1990.

The first step in any retention program is a statement of firm commitment from the highest levels of the institution (i.e., president, dean, provost). The existence of the problem must be acknowledged, and action must be implemented. Action includes financial support, staff support, and a reward system for faculty who help with retention efforts.

Once the administration does its share, what can the individual teacher do in the classroom? Dr. Baum stresses homework. Good homework should not be limited to problems in a textbook. Homework should help bring across the message that you want. It should point out what the student still needs to learn. Students should also be encouraged to complete homework together with others. Frequent testing is another important strategy. Students need to know where they realistically stand throughout the semester. Tests should be graded quickly, and problems should be discussed with the student.

A "community of scholars" should be developed on college campuses where students feel that the support exists for them to succeed. Faculty should perceive their roles as supporting students, not "filtering students." Teachers should be sensitive to students' perceptions. In addition, freshmen should be paired with upperclass mentors. Students can give other students important insights.

Higher education should include more vocational training via role models. The first role model is the classroom teacher. The teacher should be concerned about giving professional impressions via clothing, behavior, and speech. One should invite visitors from the community to address the class. This will help motivate students. Models should not always be white and male.

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Summary of "Design For Excellence: How to Study Smartly" by Dr. Lloyd M. Cooke at Seminar/Workshop at Bronx Community College on May 23, 1990.

Very few students know how to study effectively. The attrition rate for minority students in engineering programs is very high, especially after the first year. We need to help these students succeed and achieve their intellectual potential.

Many students study for tests and then forget the material. However, students need to learn that the purpose of studying is to master the material. They also need to learn that certain requirements have to be met for different career paths. For instance, today, medical school applicants must show that they have passed an undergraduate calculus course.

Students should be encouraged to work together. Many students solve problems more proficiently and accurately if they are part of a group process. In addition, Native Americans, Chicanos and Anglos will all approach a problem differently. Thus, students in mixed groups are exposed to different methods. Teachers should schedule time for the students to work together on homoewrk.

At Case Western Reserve, Dr. Cooke arranged with industries to provide summer employment for minority engineering students. Dr. Cooke found that minority students who came in with the highest SAT scores, refused to be part of the program, because they assumed that it was a remediation course. Thus, students with GPA's between 2.0 and 2.5, received the jobs, as long as they were willing to participate in a tutor, mentor program. Results indicated that the college GPAs of students who participated in this program, exceeded the GPAs of students who refused to participate.

As previously mentioned, calculus is an important entry requirement for schools of engineering and medicine. The sequential process in our educational system that enables a student to take calculus in college includes passing seventh grade math, high school algebra, geometry and trigonometry. What are the essential arithmetic skills required to succeed in high school algebra? The student must have mastery transforming fractions to decimals and to ratios, a clear picture of what

an equation is, and the understanding of integers.

According to Dr. Cooke, calculators should be permitted, since computational mastery is not the essential component; comprehension is. Graphic programs of IBM and Apple are great because they enable the student to get a feel for a mathematical relationship.

In summary, teachers should stress learning for mastery, and encourage group study to learn ways of solving problems.

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APPENDIX D

SEMINAR/WORKSHOP SELECTED PRESENTATION SUMMARIES

"STRATEGIES FOR RETENTION OF WOMEN & MINORITIES IN ASSOCIATE DEGREE PROGRAMS" By Dr. David R. Reyes-Guerra, PE
at New York City Technical College on January 11, 1990

Addressing retention, the way we use it in education, is similar to addressing death. It is a final point. There is no return. It is an outcome, the subject either lives or dies. The outcome of our failure to keep students in school; professionals in their chosen field; families as a single unit; are all an outcome of retention. Retention measures our ability to maintain a whole, whatever that whole might be. We usually refer to retention as a percentage of a whole. Retention is the "good word". One hundred percent retention always means something good, especially when dealing with education. Regardless of the subject, "we always accentuate the positive", any percentage quoted that approaches 100 % is considered good, the language scale goes up to "impressive" and other such good qualifiers when we reach 100%. It is not in our nature to address the negative aspect, as a matter of fact we do not have an antonym that conveys in the negative sense the same meaning that retention conveys in the positive sense.

When dealing with retention I believe we should "accentuate the negative". Though it is good to be proud of 90% retention, we should be more concerned about the 10% loss, and the many sordid and damaging effects it has on whoever is represented in that 10%. In education the lower the grade at which that loss occurs, the more human damaging the effects. Yes, a grammar school child who fails is more deeply scarred than a Ph.D. candidate who fails to pass the comprehensive exams, but I get ahead of my story...

Let me return to describing retention as an outcome. This, to me, has been the problem with our approach to discussing retention. It is the terminal figure. We must make a fast retreat from retention to "accentuating the causes", either good or bad that cause retention to become important to us. That is what we must attack, and unfortunately with our society and our own professional education system geared to immediate rewards, retention problems are never backtracked to all the causative issues. The problem with the failure to pass the comprehensive examination by the Ph. D. candidate is not necessarily in graduate school... the problem may be originally traced to grammar school and compounded from then on at the next levels. It is true that the problem could have been partially corrected or remedied in intervening years, and again it could have occurred in graduate school itself.

What I am addressing is the fact that retention as an outcome, expressed in a finite number, is an outcome that completely ignores our human nature, does seldom address quality and is always expressed in today's term rather in terms of its inception. Talking about outcomes should encompass a total profile of an individual over a lifetime of causative efforts..

It is my intent to work with you towards sharing some understanding of the roots, the beginnings of our attention to retention and refer to some strategies that may be useful in obliterating the term from our educational vocabulary. I predict the latter will never happen, but it is nice to set an unattainable goal, once one understands the implications of this effort.

From the outset let me sympathize with you and point out the enormity of the challenge you have. Associate degree level science and technology education is by far one of the most difficult of all higher education efforts. It is one of those "no win" situations. You are faced with the difficult task of completing a recognized (hopefully accredited) higher-education program in two years. Your students go from freshmen to seniors in one year... they are following one of the most demanding intellectual programs... they are also maturing and moving through one of the most difficult periods in their lives... they are in the initial

steps of becoming fully independent... they are attempting to complete a practical, terminal academic program in two years. Transitional periods are always difficult, in the case of students they are extremely hard on all their "people" communities: parents, teachers, peers, adults. Even the law does not know how to handle these young adults. They are not children, they are not adults... and you the teachers are expected to perform miracles. I do sympathize with you.

May I also comment on the gender issue. Females are physically and mentally better prepared and developed than males at this stage. All statistical references will clearly indicate that females will generally do better than males in their first two years of college... those years are the only ones you have given to you!

Charles E. Silberman, in the mid to late 60's, wrote two books, one, "Crisis in Black and White" followed by "Crisis in the Classroom". Both are thought provoking and as applicable then as they are now. They address not only the problems generated through our divisions into economic levels very much related to race, as well as the failure of our educator profession to develop a professional teacher able to cope not only with the intellectual demands of today's world but with the physical and other necessary qualifications (some of you might read smarts) that make for the necessary arsenal of weapons required by a teacher. The terms arsenal and weapons are not loosely utilized. Teachers need to be imbued with educational combat training to effectively function in the classroom. This is specially true in the first two years of college level education.

Perhaps a realization of the obvious "people" problems in education which have been so well articulated by Allan Bloom "The Closing of the American Mind" made his book a best seller. Dr. Bloom simply articulated in every day language what most people have been conscious about our education system for many years, but have not expressed in a cogent manner. Before I am taken to be a supporter of the classics as an essential requirement for an educated person, one of Dr. Bloom's landmarks, let me state that although this "body of great works" has permanent value to our society, in my estimation it is not the only means by which a person can become educated. Perhaps more importantly, it is not, as Dr. Bloom fears, the only way for education to reflect the important values these great works represent in individual lives, and therefore in the society.

I have digressed somewhat from retention, but let me clarify. The problems with retention are not the problems of the two year programs, they are the inheritance from genes planted much earlier in the educational life of the student. In many cases these are contributed to by teachers, who, through no fault of theirs, followed prescribed teacher education programs as offered by our Colleges of Education.

New concepts of the educational needs for competent teacher preparation, instituted in the late 50's and early 60's stressed methodology and pedagogy rather than subject content. Thus the paucity of well educated mathematics and science college majors who opted to also obtain a teacher credential, and teacher education majors who had a cafeteria style serving of disciplinary courses, brought about what I consider a failure of the education profession. Graduate education for teachers became part of the reward system. However, the doctorate programs became Ed.D. not Ph.D.s and were under the complete control of the College of Education not the graduate school.

Many people in education opted for advanced degrees in educational administration. The next popular advanced degree was counseling, followed by social studies. Down the bottom of the line, with hardly any acknowledged reward in the school system were the so called hard sciences and mathematics. The subjects that are the cornerstone of today's society and what you are all about in the programs you teach.

May I clarify that the Ed.D. is a good degree, but not a degree for the class room teacher. We have over populated the teaching profession with advanced degrees of little consequence to the teachers main function: imparting knowledge.

When former Secretary of Education, William Bennett, referred to the problems with education, he did not do it in a very friendly way, perhaps that is why he was so severely criticized. His style was not right... however, his data was fairly accurate. Current Secretary, Lauro Cavazos, has a different style, but he is also very much frustrated. Just read the latest "Report to the Nation" from the U.S. Department of Education.

The colleges of education pervaded with this pedagogy intensive curricula with the dire consequence that most of our senior professors in colleges of education were so trained nd have so trained, and will so train the new generations of teachers. Fortunately there are many members of the educational establishment, including the National Council for Accreditation of Teacher Education that became aware of the misguided approach to much of teacher education in the last twenty years. NCATE has undergone drastic changes in their criteria, as well as complete change of leadership and executive staff. We anticipate that the next generation of teachers, those that will have the responsibility for our children as they start on the road to the next century will be more subject matter content oriented. You are now paying the price for the experiments of the last twenty five years. Do not despair, help is on the way.

I have made extensive reference to teachers, because many of those teaching in community and junior colleges have come through the route of the extended high school, grades 13 and 14. This is more true for those in the vocational and technical areas.
Education is for ever changing; "school" education is becoming less and less of our total time given to education. The school day of a typical student involves 5 to 6, 50 minute, periods of schooling and 190 class days per year. Compare this with 365 days, and at least 5 hours per day, of television, movies, radio, newspapers and magazines, as well as electronic games, and one is amazed at how much education has happened through schooling. A real miracle!

Large cities, and our sophisticated entertainment industry have changed dramatically the way young people look at their "leisure" time. Passive exposure to multimedia entertainment is the byword. Young people and adults are sitting back and demanding to be "entertained." Learning experiences that motivated investigation of sciences and technology are disappearing. The scouting movement and other outdoor organized youth groups are suffering from lack of participants. Computers are the by-word, but how many minority families or those with limited income can afford a computer and the accompanying software. Will young women be encouraged to pick up laboratory or computer familiarity and knowledge? How many of our modern engines can be repaired without advanced technology involving sophisticated computer driven diagnostics?

The above possibly somewhat disconnected thoughts set the stage to move into our theme of retention as experienced at the 2 year college.

Any strategies that we might discuss for improving the retention of students in technology or science programs at the associate level must relate to the interest and motivation of young people; their perceptions of the world they are in and the world they will be working in; their background of at least 12 years of schooling; the respect in which they believe are held the various professional programs by their community (including their immediate family); the economic, yes, the economic rewards of the field of work; the opportunity to be an individual or an entrepreneur; the amount of leisure time available; and many other factors, all contributing to the whole.

Much to our regret, as clearly pointed out by Alexander W. Astin and his associates in "The American Freshman: National Norms for Fall 1988" students go to college in order

to get a better job, to make more money and other minor reasons... Only 21% of the students planned on an associate degree as a final degree--as opposed to 56% seeking a baccalaureate as a final degree. The top three objectives defined by the students were to: 1) be well-off financially (75.6%), 2) Becoming an authority in his or her field (68.1%), 3) Raising a family (64.3%).

The trend towards practical goals, economic status, and the new social order: me and myself, are becoming the norm. Lack of responsibility for ones actions and the new moral code: it happened to me because someone else caused it to happen, they are responsible...brings about the litigious society, the new "discovered" rights, and the need for teachers to carry liability professional malpractice insurance. In this type of environment, who wants to be a teacher...

Johann Amos Comenius, an educator and theologian, wrote the following:

> *The education I propose includes all that is proper for a man, and is one in which all men who are born into this world should share...Our first wish is that all men should be educated fully to full humanity; not only one individual, nor a few, nor even many, but all men together and single, young and old, rich and poor, of high and lowly birth, men and women--in a word, all whose fate it is to be born human beings; so that at last the whole of the human race may become educated, men of all ages, all conditions, both sexes and all nations.*

Comenius views world tensions as stemming from religious differences and believes that organizing and centralizing knowledge so that it could be taught to everyone would make education relevant to every day life and to the common man. Universal education espoused by Comenius makes him the first advocate of education for women and minorities. His philosophy of universal education goes by the name of *pansophism*. To Comenius science is a handmaiden to religion and not a competitor. All learning should be pooled in a central "college of light". Comenius believed that universal education would eliminate wars.

This brilliant individual lived in 1562 - 1670. A person crying for educational reform over 300 years ago...

Last week a very bright person, with a degree in English literature, a teaching certificate (who left teaching for a better paying job in advertising), was discussing the future. "I will go and get an MBA degree, though I really would like to get a degree in Geology, but the MBA will give me added income, the Geology knowledge is what I really want...but I cannot afford it". The motivation for education is there, the goal is financial reward, the choice of education is not to satisfy an intellectual challenge, but simply the practical search for material status. Somewhat short sighted, but not a typical.

The great challenge to education is to be able to meet intellectual challenges and satisfy goals and expectations with material satisfaction in a challenging career path. What is very interesting is that a properly motivated person will continue to seek intellectual excellence in her field regardless of financial consideration. Let me not give the wrong impression, financial reward is itself a great motivator and not to be scorned at; we need to make education a financially rewarding profession and remove that deterrent to considering a career in education for so many competent individuals who choose another career simply because of financial considerations. We need to enable the teaching profession not only intellectually but financially.

> *"It will be perceived that the number of graduates is small when compared to the number of which the first class consisted; but of the number admitted, all received instruction in a greater or less degree. A portion of the class, from want of capacity or industry, was honorably discharged or dismissed at the end of the probationary term of four months.*

*Some of them held on to the end of the first year; others as they advanced to the higher branches, finding difficulties which they could not surmount, successfully fell off, until upon the completion of the course, but thirteen (of the original sixty-eight) were found worthy of the diplomas conferred under the regulations of the institution.*

*It may appear at first view that the standard has been fixed too high; but the Board believe all who have not been dismissed for misconduct have been educated to the extent of their capacity, and they indulge the hope that, though not found entitled to the highest distinctions of the institution, very many of them have been thus prepared for useful and honorable stations in life".*

The above, taken from "The Story of The Citadel" by Col. O. J. Bond, quoting the 1854 report of the Board of Visitors of that college, points out several interesting issues in retention: 1) not all persons have the same intellectual (educable) capacity; 2) some persons are not motivated to study (industry); 3) not all persons can cope with higher education requirements; 4) even though a student must drop off he has received some instruction and this is worth the effort--the student is better off for having attended no matter for how long.

A good student, completing a high school academic program has several options for higher education. In terms of years of study and needs for a financial and personal commitment the student may choose a program terminating with:

a) doctorate (seven to nine years of education--assuming five years for a completed medical degree as compared to three years for some other academic doctorates);

b) baccalaureate (four years) with a masters (one or two more years), or,

c) associate (two years). Either as a terminal degree or a transfer program.

In certain fields, such as most of the sciences, to be a member of that professional discipline one either goes the associate route, which provides a practical marketable employment possibility or, one must go all the way through a doctorate to find suitable professional employment in the discipline. The baccalaureate experience is still available for those in engineering or education as a viable entry into those professions. However the pressure is on for graduate education--a masters degree--as a necessary entry point.

The associate route, if not followed as a transfer and exploration route to higher degrees, becomes an entrance point into the work force in a highly desirable occupation, that of a technician or technologist. This is a suitable goal for many people and should not have any negative implications. Our society which is degree crazy, does not act in an intelligent manner when it downgrades two year education programs. More power to you!

The world of today, and the world of tomorrow require a new look at occupations and the needs of the work environment.

*"We hold these truths to be self evident, all men are created equal that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness."*

The above words are true, but do not state that all "men" have the same intellectual capacity nor that all have the same interests and motivations. Unfortunately our educational approach has been one of assuming that every person is created with the same intellectual ability. We know this is not true; we have no problem in admitting that this is not true when dealing with physical ability. We know that not all persons can become Olympic stars or even varsity competitors. However, when it comes to education and professional status

we tend to assume that all persons can become anything they want to be. This is patently not true. One of the myths of education that does more harm than good.

Yes, we do have a major problem in education, and that is the failure to provide **OPPORTUNITY** for all students to be educated to their capacity. And this failure is the most heinous crime we perpetrate on our young people.

Retention is a problem, but in the case of two-year institutions it is the culmination of a process for which the two year institution is not responsible, and which it is not equipped to remedy.

Two year institutions can become a very easily remedial institution. This is not wrong, however, it is such a waste to place this obligation on a higher education institution rather than where it belongs... in the pre-college education years.

To address strategies that work to improve retention in engineering technology and science programs for students, regardless of gender or race, is almost a waste of time. I am not in the least being critical of those associated with the two year institution, I am simply reflecting that a strategy at that level is too late. The focus must be in the pre-college years and the quality of instruction as well as the opportunities given there. However let me identify some strategies that work.

**Truth in Advertising**. The two year institutions must be very explicit as to what they offer, what they do not offer, and clearly state the work and career opportunities of the particular field.

**Truth in Curricular Content.** A description of a math course that reads as if it where calculus rather than arithmetic does not do anyone any good.

**Truth in Faculty.** A faculty that downgrades the student and the subject taught does not serve education well. Enthusiasm for the subject is easily transmitted if the teacher is enthusiastic about the subject.

**Truth in Goals and Objectives.** Students need to be aware of the goals and objectives of the program and given an opportunity to accept and relate to those goals and objectives.

**Truth in Remediation**. Students that due to their background need remediation, must be so identified before allowing them to "flunk" and must be provided with caring and committed remedial tutoring.

**Truth in Careers.** Students need to be convinced and aware of the relationship of the curricula to their career aspirations.

**Truth in Competency.** Faculty members need to be truthful about their background and their expertise. They must be proud of their accomplishments and convey their dignity to the students.

Many of you may have already thought of other **truths** that you believe are applicable. As long as they are **truths** and you, as a member of the faculty, administration or staff of a two year institution or program believe in them: **use them.** In education, **truth** is our most important commodity. Also remember that every faculty member is a role model: if you are one, act as one. It goes with the job.

Today we are faced with an economy and a work environment that is completely dependent on consumer goods produced by a galloping technology that every other day gives us more sophisticated and desirable products. The products of technology are so versatile and become such an integral part of our lives that we are unable to comprehend how we

ever existed without them. We have yet to "fool mother nature" but we are getting close to that point.

We live in a global economy, this will increase by leaps and bounds over the next few years. The 1992 announced European Community; one single country out of a number of countries that over the years have been both friends and enemies of each other, even going to war on many occasions, is a concept hard to understand. But it is occurring. The Pacific Rim is also becoming a single market. The world of the next century is going to be entirely different than the world we now know.

All of the above changes are related to technological development. We are slowly moving into a society that will need a plethora of technologists and technicians to service, maintain, modify and produce the products of technology. The needs of today's world are the dreams of yesterday. What people consider essential today were not even available a few years back. Consumer products and needs are being fed by today's galloping technology. The number of rewarding careers in these service oriented areas are still not fully comprehended by our futurists and those in charge of predicting future labor needs. The opportunity to be an entrepreneur in the service industry is very appealing to many.

Education is too precious and too expensive to waste. The two-year programs need to make a concerted effort to portray the career opportunities they generate with all the pluses and minuses. Retentivity can be immensely improved if the student is fully aware of what her future holds in store for her after completing a given program. The demands of the program must also be clearly explained. The best student is a motivated and directed student. She knows where she is going, how to get there, and the rewards of attainment.

You as teachers must be aware of treating students with respect. Learn what turns them on, and above all never downgrade them. Always be positive.

One well known strategy for motivating students is exposure to role models from the world of work. Call on the local industry that feeds from your graduates, call on graduates who are going on their own for further education or pursuing an entrepreneurial activity. Have them address your students. You do not need to prompt questions, they will come from a group of eager students who, even though they might hide behind a sophisticated and cool "I do not care" veneer, are really eager to know what they are getting into a person who preceded them by a few years is the best role model.

We must admit that college admission standards, in most cases, are based on college admission test results, as well as high school grade point averages and academic background of courses taken in high school. These tests never relate to motivation nor to inventiveness of creativity. Those students who academically qualify for a four year college will tend to go there. Unfortunately the two-year institutions do not generally get the top academic students. Exceptions do occur, but are not the norm. However, as I mentioned before you may be getting the creative, inventive person who is ready to open up. We must admit that some students will attend the two-year institution as they make up their mind for pursuit of a career. These are the students who choose a science or general program in the two-year institution. That program allows them time to take remedial courses and to prepare for a possible transfer.

The students enrolled in engineering technology are mostly committed. In many cases their program is so oriented that it becomes difficult for them to transfer much of their college work towards a degree in a four year program except to those engineering technology four year programs.

A student must never be led to believe that there is no further education available to him upon completion of an associate program. It is true that there may be no credit given

towards a particular degree for the two-year effort, but education is always available and always welcomes students regardless of background.

The Engineering Manpower Commission in "Engineering and Technology Enrollments Fall 1988", and in "Engineering and Technology Degrees 1988" indicates the following enrollment and degree data for students pursuing associate level degrees:

| | Total Full Time | Total Part Time | Total Degrees |
|---|---|---|---|
| Total Students | 42115 | 36954 | 13943 |
| Women | 4839 | 5139 | 1385 |
| Blacks | 2998 | 2732 | 601 |
| Hispanics | 1231 | 1045 | 255 |
| Asian Americans | 1167 | 822 | 365 |
| Native Americans | 226 | 91 | 57 |

For the same period the total number of full time undergraduate engineering students was 346,169, part time 39,243. The number of graduates at the baccalaureate level 71,386. The proportions of the listed minorities to the totals were the same for engineering as shown for engineering technology. The data clearly show a small number of women and minority students attracted to associate degree programs in engineering technology. There is no reliable data available in science programs, this is due to the fact that many of them are transfer programs and do not list themselves as science programs.

A comparison of U.S. manpower data with that of leading industrialized, technology directed countries oriented to both design and manufacturing in Europe and Asia shows many differences in the technological work force, both in preparation and utilization. The ratio in those countries between engineers, engineering technologists and engineering technicians (including science and industrial technicians) is on the order of one engineer to five engineering technologists to between ten and fifteen engineering technicians. In the U.S. the ratio is that of five engineers to one engineering technologist and seven technicians. The graduates of associate level programs if considered technicians are one out of the seven mentioned. The other six are products of vocational and technical high school programs, or high school graduates, who have obtained their training as technicians through industrial apprenticeships or other type of programs.Perhaps we need to do a thorough analysis of the utilization of our technological manpower team to determine efficient ratios and thus gear our educational strategies to answer the real needs.

I believe that there is a need for the better educated associate degree graduate for our competitive technological survival. We need to develop strategies to call to the attention of industry and of prospective students the value of the education offered by the two-year institutions. A value which redounds in a "smarter" work force with higher and more efficient understanding and productivity.

The associate degree programs need to engage in a more significant marketing and public relations campaign extolling the value of their graduates to both students, teachers, parents, and the complex of industry/government/public.

There are very few legal or professional regulations for the practice of technology. The graduates of two year associate programs need to be made aware of the various certificate programs. The Institute for the Certification of Engineering Technicians is a small group that needs strengthening by having more two-year associate engineering technology

graduates seek certification. This added dimension to the total preparation of the engineering technologist will add strength to the profession.

The faculty, by example, must lead these efforts. Being negative about certification does not enhance the professional possibilities of others.

Graduates of two-year associate programs related to engineering technology or science have difficulty identifying with a professional or technical society. Unfortunately the available organizations are geared to answer the needs of the graduates of four year engineering or science programs. The two-year graduates must join at a different level and in many cases are kept from full membership unless they qualify through further study for a higher degree. The two-year graduates need their own organization and whatever that might be needs the support of all.

The history of professional and technical societies shows that their development originated with efforts of faculty members who saw the need. Perhaps you may see that need and may decide to start your own societies. This would provide not only a forum for discussing problems, setting goals and objectives, but would provide the strength of numbers as opposed to individuals, associated in an organization that would stand for the ideals of engineering technology.

In spite of the fact that engineering technology graduates have ample opportunities for employment there is a tendency for students who qualify for college to ignore the two-year associate programs. A not very scientific study has indicated that some students enroll in two-year engineering technology programs simply to remedy high school deficiencies and prepare themselves for transfer to the four year institution. These students contribute to the negative statistics on retention. It is true they have not been retained in engineering technology but we can not consider that they are negative to technological education.

"A Study of the Distribution of Achievement for Minority Students in U.S. Engineering Schools" is being carried out by Mr. Thomas Phillips as an ABET project sponsored by EXXON. This is one of the only studies in which each individual has been followed through high school and college transcripts longitudinally from high school through college. The data accumulated contained college entrance data as well as other personal data. Eighty one institutions participate in this ongoing study and over 1000 students have been processed. The data goes back to ninth grade. The issue that retention is a problem that must be handled at the pre college level is quite evident from this study. Though the study is not yet complete I can give you some advance results:
The persistence for Black students in engineering college is 4.3 semesters, 50 credit hours, with a mean GPA of 1.88. For Hispanic students, the average persistence is 5.1 semesters, 66 credit hours, with a mean GPA of 2.35. The percentage of Black students on track to graduate is 25% and for Hispanics 33%. In the case of non-minority students this percentage is 50%. An analysis of data shows that poor English and poor mathematics and physical sciences are accurate predictors of failure in the college setting. Would you believe that the more important factor appears to be English communication skills appear to be the most significant factor in predicting success in engineering. Students with poor English backgrounds do poorly.

A strategy that is tentatively derived from this ABET/EXXON study is the need for "bridging" courses between high school and college, regardless of what the high school transcript shows. The need for diagnostic tests at the entry point in college is evident. Strong advising and remediation of deficiencies before allowing the student to enter the specified engineering technology or science prescribed curricula is a must.

I conclude with a quote from "Changing America: The New Face of Science and Engineering" the Interim Report of the Nations Task Force on Women, Minorities and the Handicapped in Science and Technology, dated September 1988.

*"The problem we face in the science and engineering professions stems from powerful underlying forces in American society, including discrimination, poverty, and deficits in education. Poverty continues to grip a large number of children, including a disproportionate share of minority children. The Nation's public schools have traditionally provided a common pathway to the American dream of economic opportunity, but today the schools are hard pressed to serve the needs of children-at-risk. Most elementary and secondary schools do an inadequate job of preparing students in mathematics and science. Colleges and universities recruit too few science and engineering students, particularly students from under-represented groups, and do not retain enough through completion... The problem is continued by employers who have not yet opened career paths widely and visibly enough to prospective talent. It is further exacerbated by the mass culture".*

and...double goes for you in the very difficult but essential group of educators coping with engineering technology and science in associate degree programs.

**The Graduate School and University Center**
of The City University of New York

Center for Advanced Study in Education
Institute for Research and Development in Occupational Education
33 West 42 Street New York, N.Y. 10036
212 642 2942 FAX 212 719 2488

Summary of "The Role of the Teacher in Student Retention" by Dr. Eleanor Baum at Seminar/Workshop at New York City Technical College on January 11, 1990.

Dr. Baum listed twelve strategies for teachers to follow in effective student retention programs:

1. Attitude - Teachers should exhibit an attitude of wanting to help students succeed. They should not act as if the students have "to prove that they can make it in the course."

2. Students should be treated with respect. For example, teachers should correct students without "putting them down."

3. Sensitivity to different feelings and responses of students. For example, female students in nontraditional classes at Cooper Union, report that obscene comments have been addressed towards them.

4. Encourage students to work together in groups. Research has shown that this helps students attain good results.

5. Develop good tests. Good tests review whether students understand the key points. Do not try to demoralize students!

6. Frequent testing. A student should not have to wait until the end of the semester to find out that s/he does not understand the material. Feedback on the tests should be quick and full of suggestions, comments, and positive feedback. If the student is exhibiting problems, and you refer him or her to a tutor, take a proactive approach. For example, ask the student whether an appointment was made with the tutor, and whether the tutorial sessions were helpful.

7. Homework is critical. Homework should help students learn skills which are lacking.

8. Be available outside of class. In a study which looked at minority students who successfully completed college, and those who did not, it was found that the successful students reported a close interaction between themselves and a faculty or staff member.

9. Remember the names of your students. Always refer to all students in a consistent manner (i.e., refer to all of them by first name or by last name).

10. Role models motivate students. Have your students meet other students who successfully completed the program. Don't just schedule female role models to address female students, or minority role models to address minority students; have them address the whole student body!

11. Encourage students to have high goals and aspirations.

12. Create a nurturing environment in the classroom.

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Summary of Small Group Discussion by
Dr. Lloyd M. Cooke at Seminar/Workshop at
New York City Technical College
January 11, 1990

This small group discussion focussed on two subjects.

The first was "How can I, as an instructor, get closer to my students so that I can better assist them individually?"

The group discussed the importance of being alert to signs of discontent, disinterest and being "out of phase" among their students. Signals from students from different cultures were considered. Body language was brought to reality with a demonstration by the moderator who was able to tell each participant what they may have been thinking.

The second subject was "How can the booklet Design for Excellence: How to Study Smartly help me understand and practice some of the excellent ideas I heard today?" The moderator challenged the group to adopt three of the "Study Smartly" concepts immediately and also practice some of the advice they received at the workshop. They responded enthusiastically and seemed to accept this "trick" to help them gain more from the workshop.

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of The City University of New York

Center for Advanced Study in Education
Institute for Research and Development in Occupational Education
33 West 42 Street, New York, N.Y. 10036
212 642 2942 FAX 212 719 2488

Summary of "Pluralism in Science and Technology Programs: Preparing Women and Minority Students." by Dr. Sara Melendez at Queensborough Community College on March 21, 1990.

According to the American Council of Education, AfroAmericans are 3% of all bachelor degree recipients in engineering; Hispanics 3%, and American Indians 0.3%. In biological sciences, AfroAmericans are 5% of all bachelor degree recipients; Hispanics 3%; and American Indians 0.3%. These figures are presented against the fact that 25% of all American individuals between the ages of 18-24 are represented by the previously mentioned minority groups.

Some reasons for the underpresentation of minority groups in the sciences may include the following figures: 40% of Hispanic and 50% of Black children live in poverty, and only 40% of children who qualify for HeadStart are funded.

Dr. Melendez suggested that schools of higher education should teach English as a second language through the different content areas. Some colleges are currently teaching freshmen bilingually in course areas such as biology, while the students are learning English as a second language. In addition, institutions of higher education need to take into account individual students learning styles. Dr. Melendez defines learning styles as preferred modes of classifying, organizing, and assimilating information about the environment. Cognitive styles are related to learning styles and refer to how one organizes, retrieves, and uses information to solve problems. These styles are not absolute, they are the preferred styles of students.

Research has found that White, Anglo, West European cultures stress field independence (elements are perceived as discrete from the background), analytic ability (one looks at individual trees, before investigating them as a forest), and lack of affect (objective and impersonal). This is very different from Third World, Non White, Non Anglo cultures which stress field dependence (backgound is important), a wholistic approach (one first sees the forest, then the trees), and affect (emotions and relationships are important). According to Dr. Melendez, women fall in between both cultures. She also stated that both styles can be taught.

In math and science, economically and academically disadvantaged children bring a lack of experience upon which to build abstractions of science. For females, this may be due to lack of encouragement by parents and teachers; for minority students, it may be due to lack of money for toy chemistry sets, or lack of proficiency in the English language. Thus, a curriculum needs to be developed in which direct experience preceeds discussion of formal concepts and laws. For example, students traditionally are required to first read a passage in chemistry describing a concept, before they are permitted to experiment in the lab. Minority and female students may benefit from the reverse process.

Dr. Melendez stated that science courses should be more personal. Affective and cultural components, as well as, support systems (i.e., peer tutoring, small study groups) should be included.

Dr. Melendez cited two model programs. She initially described a program in Massachusetts called "Search for Knowledge." In this program, students read articles about the environment, and are then encouraged to pose questions relating the article to their personal local environment. They are taught the skills needed to help them find the correct answers. Thus, learning becomes situated in context of a local problem and is purposeful and constructive.

Xavier University, in New Orleans, sends more Blacks to school of medicine and pharmacology, than any other college in the country. They developed a summer bridge program with local high schools. Students are presented with scientific problems designated to teach the inductive approach, and scientific reasoning. Students work in small groups, and are given specific instrucion in improving verbal ability, quantitative reasoning, critical reading, and test taking skills. Field trips are scheduled to labs, hospitals, and nursing homes, which include contact with a minority professional. This is important, because children see that other minority adults work in the areas of science and health. Another important aspect is that both Xavier and high school faculty run the programs, so that the children get continuity in their education.

Dr. Melendez ended by adding another important point. It is important to create environments for students to organize study groups and ask questions. Minority students often do not ask questions because they do not want to further stigmatize themselves as not knowing the answer. There must be an explicit message; it is okay to ask for help.

## APPENDIX E

## SEMINAR/WORKSHOP BROCHURES AND PROGRAMS


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# Jose Mestre

# Cognitive Research in Math/Science Education

Co-sponsored by:

National Science Foundation

Grant No. 440489
Comprehensive Regional Center
for Minorities
Dr. Hope Hartman
Faculty Development Coordinator

AND

N.Y. State Dept. of Education

VEA# 152-90-1913
Center for Advanced Studies
in Education
Dr. Stan Brodsky
Project Director

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**FOR FURTHER INFORMATION**


BRONX COMMUNITY COLLEGE
Louise Squitieri 212-220-6123

AT CENTER FOR ADVANCED STUDY IN EDUCATION
Stan Brodsky 212-642-2938



This Seminar is supported by a grant from the New York State Education Department under the Carl D. Perkins Vocational Education Act (VEA No. 152-90-1913) and is conducted by the Center for Advanced Study in Education of the City University Graduate School (CASE/CUNY), Dr. Stan Brodsky, Project Director.

# MAY 23, 1990

**PRE-REGISTER NOW**

**SPACE IS LIMITED**



-11-

# Classroom Strategies
## For Retention
### Of Women & Minorities in Associate Degree Science & Engineering Technology Programs

**Wednesday, May 23, 1990**

**Language Hall Conference Room Bronx Community College**
**University Avenue & West 181st Street Bronx, NY**

**PRE-REGISTRATION FORM**

Please reserve a place for me at the Classroom Strategies Seminar on Wednesday, May 23, 1990.

NAME (please print) _____

TITLE _____

DEPARTMENT _____

ROOM NUMBER FOR COLLEGE MAIL _____ TELEPHONE _____

HOME MAIL ADDRESS _____

_____

_____

HOME PHONE _____

**TEAR AT FOLD AND SEND TO:**

Louise Squitieri
Biology Department
Havemeyer Lab, Room 105 (Phone 6123)




# Classroom Strategies
## For Retention
### Of Women & Minorities in Associate Degree Science & Engineering Technology Programs

**Wednesday, May 23, 1990**

**Language Hall Conference Room Bronx Community College**
**University Avenue & West 181st Street Bronx, NY**


**SEMINAR PROGRAM**

**9:00 am** Registration & Check-in

**9:30 am** Welcoming Remarks
Dr. Carl J. Polowczyk
*Dean of Academic Affairs*

**9:35 am** KEYNOTES
Dr. Eleanor Baum
*Dean of Engineering*
Cooper Union

Dr. Lloyd M., Cooke
*President*
LMC Associates

**10:30 am** Refreshment Break

**10:45 am** PANEL
Dr. Louise Squitieri, *Moderator*
David Estrella, *Student*
Patricia Harris, *Student*
Arcadia Ruiz, *Alumna*
OPEN DISCUSSION

**12:15 pm** ADJOURNMENT

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**FOR FURTHER INFORMATION**

Speak to members of the NYCTC Planning Committee for the Retention Seminar/Workshop:

| | | |
|---|---|---|
| Phyllis Sperling | V818 | 3460 |
| Carmen Hernandez | N227 | 5588/9 |
| Joan Kosan | P207 | 5110 |
| Ann Sprayregen | V203 | 2527 |
| or | | |
| Stan Brodsky | V627 | 3576 |
| | or at | |
| CASE/CUNY | 212 642 2938 | |

This Seminar/Workshop is supported by a grant from the New York State Education Department under the Carl D. Perkins Vocational Education Act (VEA No. 152-90-1913) and is conducted by the Center for Advanced Study in Education of the City University Graduate School (CASE/CUNY), Dr. Stan Brodsky, Project Director.



| January | | | | | | |
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| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | | | |

# January 11, 1990



**PRE-REGISTER NOW**

**SPACE IS LIMITED**

# Classroom Strategies
## For Retention
### Of Women & Minorities in Associate Degree Science & Engineering Technology Programs

**Thursday, January 11, 1990**

**PRE-REGISTRATION FORM**

Please reserve a place for me at the Classroom Strategies Seminar/Workshop on Thursday, January 11, 1990.

NAME (please print) _____

TITLE _____

DEPARTMENT _____

ROOM NUMBER FOR COLLEGE MAIL _____ TELEPHONE _____

HOME MAIL ADDRESS _____

_____

_____

HOME PHONE _____

**TEAR AT FOLD AND SEND TO:**

Phyllis Sperling
Architectural Technology Department
Room V818 (Phone 3460).

**IF ADDITIONAL FORMS ARE NEEDED, PLEASE DUPLICATE)**

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# Classroom Strategies
## For Retention
### Of Women & Minorities in Associate Degree Science & Engineering Technology Programs

**Thursday, January 11, 1990**


**SEMINAR/WORKSHOP PROGRAM**

| | | |
|---|---|---|
| **9:00 am** | Registration Check-in | |
| **9:30 am** | Introduction & Welcoming Remarks | |
| **9:35 am** | KEYNOTE | Dr. David R. Reyes-Guerra<br>*Executive Director,* ABET |
| **10:35 am** | Refreshment Break | |
| **10:45 am** | PANEL | Dr. Lloyd M. Cooke<br>*President,* LMC Associates |
| | | Dr. Eleanor Baum<br>*Dean of Engineering*<br>Cooper Union |
| | | Prof. John Goodlet<br>*Chairman*<br>Dept. of Technology, City College |
| **12:15 pm** | Working Lunch Small Group Session | |
| **1:45 pm** | COMMENT PANEL | Students/Alumni |
| **2:15 pm** | SMALL GROUPS | Strategies/Brainstorming Sessions |
| **3:15 pm** | LARGE GROUP | Report & Wrap-up Session |
| **3:30 pm** | ADJOURNMENT | |

**ALL SESSIONS IN FACULTY LOUNGE ON THE 6TH FLOOR OF THE ATRIUM AT NAMM HALL BUILDING 300 JAY STREET, BROOKLYN**

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SEMINAR/WORKSHOP ON CLASSROOM STRATEGIES FOR RETENTION
OF WOMEN & MINORITIES IN ASSOCIATE DEGREE
SCIENCE & ENGINEERING TECHNOLOGY PROGRAMS
Thursday January 11, 1990 at New York City Technical College

PROGRAM

9:00 AM REGISTRATION & CHECK-IN

9:30 AM WELCOMING REMARKS -- Dr. Leroy R. Sparks, Provost & Vice-President of Academic Affairs

9:35 AM KEYNOTE ADDRESS -- Dr. David R. Reyes-Guerra
Executive Director, ABET
"Status & Suggested Solutions to the Input of Women & Minorities into the Engineering & Technical Professions"

10:35 AM REFRESHMENT BREAK

10:45 AM PANEL -- Dr. Lloyd M. Cooke
President, LMC Associates
"Design For Excellence: How To Study Smartly"

-- Dr. Eleanor Baum
Dean of Engineering, Cooper Union
"The Role of the Teacher in Student Retention"

-- Prof. John Goodlet, Chairman
Department of Technology, The City College
"Retention Strategies in an Upper Division Transfer Program in Engineering Technology"

12:15 PM WORKING LUNCH SMALL GROUP SESSIONS

1:45 PM COMMENT PANEL -- Jacqueline Elliot, 1984 Graduate Medical Laboratory Tech

-- Angel Sierra, Student
Architectural Technology

-- Carla Volpe, 1988 Graduate
Electromechanical Engineering Tech

2:15 PM SMALL GROUPS -- Strategies/Brainstorming Sessions

3:15 PM LARGE GROUP -- Report & Wrap-Up Session

3:30 PM ADJOURNMENT

This event is supported by a grant from the New York State Education Department under the Carl D. Perkins Vocational Education Act (VEA No. 152-90-1913) and is conducted by the Center for Advanced Study in Education of the City University Graduate School.

*President Kurt R. Schmeller*

*cordially invites you*

*to attend*

*The Fourth Annual*

*Presidential Series*

*on*

"Pluralism in
Science and Technology Programs:
Preparing Women and
Minority Scientists"

*Wednesday, March 21, 1990 at 12:15 p.m.*

*Queensborough Community College*

*Bayside, New York*

*Details Inside*

*This program is offered in response to issues of concern in our profession.*

*Co-sponsors:*

*The Committee on Faculty Development*
*The Forum Committee*
*Women's History Month Committee*
*Committee on Multi-Cultural Concerns*
*The Office of Academic Affairs*
*The Department of Student Services*
*The Office of Affirmative Action*

*This presentation is supported*
*by a grant from the*
*New York State Education Department*
*under the*
*Carl D. Perkins Vocational Education Act*
*Grant 152-90-1913*
*Dr. Stanley Brodsky, Project Director*
*Center for Advanced Study in Education*
*of The Graduate Center of*
*The City University of New York*

"Pluralism in
Science and Technology Programs:
Preparing Women and
Minority Scientists"

*Speaker*

Dr. Sara E. Melendez
*Vice Provost*
*University of Bridgeport*

Wednessday, March 21, 1990
12:15 p.m.
Oakland Room

*Refreshments will be served.*

*R.S.V.P. (card enclosed)*
*For information:*
Dr. Diane Call
*718-631-6210*

-11-

Science & Technology Expo

## ALUMNI PANEL

Friday, May 11, 1990
11:00 A.M., QCC Theater

**Queensborough Community College**
The City University of New York
Bayside, New York

This presentation to interest and educate young people in science and technology is supported by a grant from the New York State Education Department under the Carl D. Perkins Vocational Act Grant 152-90-1913

Dr. Stanley Brodsky, Project Director
Center for Advanced Study in Education
of The Graduate Center of
The City University of New York

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# *Queensborough Community College Alumni Working in Science and Technology*

*WELCOME*
Dr. Kurt R. Schmeller
*President*

*MODERATOR*
Professor Stuart Asser '67
*Department of Electrical and Computer Engineering Technology*

*PANEL*
Louise Carella '80
*Intensive Care Unit*
*Booth Memorial Hospital*

Robert Kueper '83
*Field Engineer*
*Digital Equipment Corporation*

Robin Lustgarten '87
*Bio-Medical Engineering Technician*
*New York Hospital/Cornell Medical Center*

Jose Reyes '85
*Electrical Engineer*
*IBM/Thermal Corporation Development Data*

Mark Siegel '79, '82
*Senior Engineer*
*Allied Signal/Test Systems Division*

Arthur Williams '78
*Staff Director*
*Management Employment, NYNEX*

APPENDIX F

FOLLOW-UP PROGRAMS, PROJECTS, AND ACTIVITIES


Bronx Community College 81

New York City Technical College 82

Queensborough Community College 83

APPENDIX F

FOLLOW-UP PROGRAMS, PROJECTS & ACTIVITIES

There are a number of programs, projects and activities at these three colleges which are related to the goals of this project. Follow-up activities may be direct outcomes of the campus seminars/workshops or continuing activities which are enhanced.

Bronx Community College

Two new programs have been initiated. One which focuses on retention is an offshoot of an existing program entitled Career Beginnings. Funded by the MacArthur Foundation, the 3 year demonstration project involves 100 high school students per year in a multifaceted design. Early results indicate that most will go to college while others will go to work. This project coordinates STEP with Career Beginnings.

Another new program called Higher Ground emphasizes retention for 30 college freshmen students which incorporates faculty mentors, pre-college freshman activities and the CSTEP program. Students eligible have applied for a career-oriented curriculum and require at least one remedial course.

Several ongoing projects have been enriched to some degree as a result of the seminars/workshops, according to college personnel. These include STEP, Career Beginnings, REAP (Research Enrichment Action Program), MBRS (Minority Biomedical Research Support program), and Minority Science Improvement Program (funded by the U. S. Department of Education).

New York City Technical College

Two of the seminar/workshop attendees reported using Dr. Cooke's study skills booklet, Design For Excellence: How To Study Smartly, in classes with 60 students in the Spring 1990 semester and with a similar number in Fall 1990 classes. Also a third instructor has adopted the booklet after hearing about good results.

A new two-year funded project has begun in Fall 1990 entitled "Strengthening Biology & Chemistry Education". Its goals are to increase retention and increase the number of minority students who graduate as science majors and continue in science at the baccalaureate level. The target will be 400 students each semester and will involve curriculum revision, faculty development activities and new equipment acquisition.

An ongoing project funded under the VEA is in its third year for Minority Women in Science, operating within the Dental Hygiene Department. The goals are improving retention in the Dental Hygiene program and recruitment for the program. This year they have initiated a special faculty tutoring program in class after having tried peer tutoring last year. Recruitment is being enhanced by a new video which has just been completed.

A college-sponsored project is in its second year. It involves "Development, Implementation & Evaluation of a Learning Style Inventory to Identify Learning Preferences of Students in an Introductory Biology Course." The goal is to improve student retention by incorporating learning style patterns into the curriculum. Seminar/workshop attendees direct these three projects.

An activity which relates to this project is the student organization "Women In Technology" which has been strengthened as a result of the seminar/workshop and has as its faculty advisor the professor who moderated the student/alumni panel at the seminar/workshop. This activity has increased retention of women students in various engineering-related technology programs.

Queensborough Community College

It was reported that the project events on campus has encouraged a campus-wide examination of policies and practices in the areas of retention and recruitment of women and minorities. This year's initiatives being undertaken include the following efforts.

One area involves collaborative programs with high schools to stimulate awareness of the academic preparation needed for collegiate science and technology programs in addition to projects LEAP and College NOW which provide on-site course offerings in pre-collegiate mathematics for high school juniors and seniors.

Another area includes collaborative projects with business and industry to advise on curriculum development and encourage women and minority participation.

A third area involves institutionalization of science and technology initiatives through the Office of Enrollment Management which will coordinate recruitment and retention programs and activities such as CSTEP, Tech Trek II, alumni as admission recruiters, and other related efforts. It was reported that this project has provided the focus and encouragement which has resulted in these activities being launched.

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